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Perceptions, relations and regional economic development: A case study of the Bay Area and Southern California

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by

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ABSTRACT OF THE DISSERTATION

Perceptions, relations and regional economic development:

A comparative study of the Bay Area and Southern California

By

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Doctor or Philosophy in Urban Planning

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Professor Michael Storper - Chair

This dissertation investigates the *scope* and historical *origins* of the institutional contexts behind the income divergence of the Bay Area and Southern California between 1980 and 2010. It is widely recognized in the literature that the 'secret' to the Bay Area's extraordinary economic performance in recent decades lies in the region's institutional structure. This dissertation begins by substantiating this claim by showing that theoretically-derived major income growth-related characteristics cannot explain the extent of the divergence. The research proceeds to explore the *scope* of the region's transposition-enabling socio-relational context and its historical *origins*. Findings reveal that such an institutional context is evident at the scope of the Bay Area's high-end corporate social structure, characterized by cross-realm relations and widely-shared perceptions; and at the scope of society at large evident by

the degree of generalized trust and the size of the civic sphere. By exploring the history of the civic and political/cross-jurisdictional spheres over the course of the 20th Century evidence is presented in support of an institutional 'regional effect' upon the industrial development and consequent income trajectories of these two regions.

This dissertation of Naji Philip Makarem is approved.

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Chris Tilly

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2013

This dissertation is dedicated to my wife May and my

lovely children, Shadi and Olive; with love.

Table of Contents

INTRODUCTION 1
CHAPTER 1: THEORETICAL CONTEXT 5
LITERATURE REVIEW 5
THEORETICAL FRAMEWORK: THE RESEARCH QUESTION 26
PART I – THE CASE FOR A SOCIO-RELATIONAL CONTEXT 36
CHAPTER 2: REGIONAL CHARACTERISTICS 40
POPULATION 46
HOUSING COSTS 48
EDUCATION 50
IMMIGRATION & ETHNIC COMPOSITION 52
INDUSTRIAL COMPOSITION 56
CHAPTER 3: REGRESSION ANALYSIS 62
SUMMARY - PART I 72
PART II – SCOPE 74
CHAPTER 4: THE HIGH-END CORPORATE SOCIAL STRUCTURE 75
THE RELATIONAL STRUCTURE 75
SHARED TRANSPOSITION-ENABLING CONVENTIONS 137
CHAPTER 5: SOCIETY-WIDE SOCIO-RELATIONAL CONTEXT 158
GENERALIZED TRUST AND BENEVOLENCE 162
THE NON-PROFIT SECTOR 164
SUMMARY – PART II 168
PART III - HITORICAL ORIGINS 171
CHAPTER 6: THE CIVIC SPHERE 174
FROM COUNTERCULTURE TO CYBERCULTURE 174
BAY AREA ENVIRONMENTALISM 177
CHAPTER 7: POLITICAL/CROSS-JURISDICTIONAL SPHERE 180
FIRST HALF OF THE 20TH CENTURY: REGION-BUILDIN 182
SECOND HALF OF THE 20TH CENTURY: THE GREAT DIVERGENCE 185
LA's ORGANIZATIONAL FABRIC 196
SUMMARY – PART III 203
PART IV – REGIONAL EFFECT: SEEDS LANDED IN FERTILE GROUND 205
CHAPTER 8: LOOKING BACK AND LOOKING FORWARD 205

TRIANGULATING FROM THE VARIOUS FINDINGS 205
POLICY IMPLICATIONS AND FUTURE RESEARCH 215
APPENDIX 219
Appendix 1: Regression variable construction 219
Appendix 2: Sampling method and data sources for network analysis 223
Appendix 3: Number, percentage and cumulative percentage of firms in LA and the Bay Area cities, 1980, 1995 and 2010 226
Appendix 4: Sampling method and data source for Private Foundation network analysis 229
Appendix 5: Interviewees and interview methods 232
Appendix 6: Social Capital data sources and selected variables 235
Appendix 7: Reports analyzed in archival research, by organization 237
BIBLIOGRAPHY 246

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INTRODUCTION

"'The most crucial aspect of Silicon Valley is its networks'.
There is no proposition so universally agreed upon and so little studied"
(Castilla, et al, 2000-p. 218)

A broad literature from a range of scholarly fields attributes high-road (high-waged and high-skilled) regional economic development to the innovative and entrepreneurial characteristics of the industrial structure. The quintessential poster-child of high-road economic development is the Bay Area; since at least as far back as the 1970s the region's industrial structure overcame the challenges of product and industry life-cycles by successfully developing and exploiting new windows of technological opportunities through a combination of high-end entrepreneurship, industrial genesis and product-based technological learning. The literature attributes such regenerative and innovative industrial capabilities to cross-realm relations that enable the novel re-combination of ideas and resources through the coordination and collective actions of diverse people, firms and institutions.

The literature in the fields of institutional economics and economic sociology attribute industrial genesis to a process called cross-realm relations, whereby novelty emerges from the fusion of ideas and conventions from across diverse realms. A review of the broad literature on regional economic development substantiates this theoretical aspect of institution-building and innovation, and draws from the literature in economic sociology and new institutional economics to develop and operationalize the concept of a 'transposition-enabling socio-relational context', characterized by cross-realm relations and widely-shared perceptions and beliefs. A transposition-enabling socio-relational context is theorized to act

as an institutional context conducive to cross-realm transposition and consequent institutional genesis, invention and innovation.

The research in this dissertation is designed to explore the plausibility of a 'regional effect' hypothesis which claims that the widely-recognized transposition-enabling socio-relational context in the Bay Area's industrial structure is regional in scope, can be traced back to developments and social learning experiences in the region's civic and political/cross-jurisdictional spheres, and thus played a catalytic role in the genesis and evolution of the IT industry and the broader industrial structure.

The research is designed as a comparative case study of the Bay Area and Southern California metropolitan regions, two highly successful and advanced regions in the same State, which by 1980 enjoyed very similar levels of income but have since diverged substantially; the Bay Area's extraordinary income growth between 1980 and 2010 contrasts sharply with Southern California's. The premise behind the case selection therefore is that the Bay Area's widely recognized institutional context behind its economic success, characterized by university-industry relations and brokered cross-realm relations for example, are absent in Southern California. Bay Area findings about its socio-relational context will thus be substantiated by contrast with Southern California findings, thus adding an additional degree of robustness.

The study is structured into three-parts. The first investigates the degree to which the Bay Area's 1980 to 2010 income growth can be attributed to major regional income growth-related characteristics and dynamics over the divergence period. By evaluating the explanatory power of several theoretically-derived deep-determinants of regional economic development, the analysis shows that none could satisfactorily explain the extent of the Bay

Area's extraordinary income growth over the period. The research in Part 1 of this study thus corroborates the widely-accepted notion in the literature on industrial districts and learning regions in general, and the Bay Area in particular, that institutions are likely to have played a key role in the Bay Area's economic success. This is because the most plausible explanation for the Bay Area's income growth is shown to be a function of its increasing education premium which was driven by its industrial specialization and branching out of its industrial structure into highly innovative activities that demanded highly skilled and educated workers. None of the theoretically-derived income growth-related characteristics could satisfactorily explain the dynamic evolution in the Bay Area's industrial structure.

The research into the scope of the Bay Area's transposition-enabling socio-relational context begins in Part II, by investigating whether such an institutional context is evident at the broad scales of the high-end corporate social structure (chapter 4) and society at large (chapter 5). The analyses show that the Bay Area's high-end corporate structure is characterized by cross-realm relations and widely-shared belief systems throughout the divergence period, whereas such a transposition-enabling socio-relational context is absent in LA's high-end corporate structure. The analysis also reveals that society at large in the Bay Area's enjoys higher levels of generalized trust and benevolence, as well as a relatively much larger civic sphere, contributing some evidence that the region's transposition-enabling socio-relational context is also apparent the scope of society at large.

Consistent with evolutionary economics and its emphasis on the role of multiple co-evolving spheres in economic dynamics, Part III explores the degree to which developments and social learning experiences in the civic (chapter 6) and political/cross-jurisdictional spheres (chapter 7) over the course of the 20th Century might have developed or shaped a regional transposition-enabling socio-relational context in the Bay Area. The analysis begins

by recounting Fred Turner's thesis about the role of the cross-cultural transposition in the genesis of the Bay Area's IT industry and its subsequent socio-technological trajectory since the 1970s. In light of the critical role played by widely-shared ecological belief systems in this cultural transposition, the research focuses on developments and social learning experiences in the Bay Area's environmental movement since the founding of the Sierra Club in the 1890s. The history of the environmental movement attests to the emergence of cross-realm relations and widely-shared belief systems across diverse communities in the Bay Area over the course of the 20th century. By the 1960s and '70s a transposition-enabling socio-relational context is evident in the region's civic spheres. No equivalent civic and cross-cutting dynamism is evident in Southern California.

The analysis in chapter 8 shifts from the civic to the political/cross-jurisdictional sphere. The two regions' propensities for cross-jurisdictional coordination are contrasted by analysing regional projects and initiatives in the two regions since the early 1900s. The analysis shows that the two regions diverged substantially around the mid-1900s in their propensities for cross-jurisdictional coordination around regional projects and initiatives. As a consequence of the Bay Area's superior propensity to overcome serious coordination challenges, the region developed cross-realm relations and widely-shared belief systems around its regional transit and developmental challenges. The analysis also reveals regional characteristics which enabled the Bay Area to overcome its coordination challenges, namely its first nature geography, the relatively advanced stage of physical development, and the jurisdictional make-up of the region.

The evidence presented in Part III support the 'regional effect' hypothesis by showing how cross-realm relations and widely-shared belief systems were developed in the civic and political/cross-jurisdictional spheres of the Bay Area over the course of the 20th century. The widely-recognized sequences of events which culminated in the genesis of the IT industry and its subsequent industrial evolution are thus shown to have emerged in a broader transposition-enabling socio-relational context which plausibly played a defining role in its developmental dynamics.

CHAPTER 1: THEORETICAL CONTEXT

LITERATURE REVIEW

By the 1980s and 1990s transactions costs had fallen substantially as national economies liberalised their economies, and technological innovations reduced communications and transport costs. While some economies flourished, others floundered. This is true at the international scale, with the rise of China, Hong Kong, South Korea, Singapore, Taiwan and to a lesser extent India since the late 1960s and 1970s, and the demise of Sub-Saharan Africa since the mid-1970s and Latin America in the 1980s and to some extent the 1990s (Rodrick, 2003). It is also evident at the inter-regional and sub-national levels with the rise of the incomes and populations of cities such as Atlanta and Phoenix and falling incomes and population in cities such as Pittsburgh and Detroit over the past three to four decades. The evident lack of sigma convergence across all economies and time-frames spawned the proliferation of economic models and theories to explain this counter-theoretical phenomenon in the world of neo-classical economics.

The most popular explanations for the evident lack of sigma convergence were conditional convergence and consequent convergence clubs, with an emphasis on institutional characteristics (see a comprehensive literature review of studies by Aron, 2000), increasing returns from pecuniary externalities to scale between regions (Krugman, 1987 and 1991; Krugman and Obstfeld, 1991; Combes et al, 2008) and increasing returns from innovation (Lucas, 1988; Romer, 1994; Grossman and Helpman 1991).

The conditional convergence hypothesis spawned a burgeoning literature in the 1990s to determine the extent to which institutional quality, the structure of governance, and the extent of social capital (civic engagement and trust) affect growth (See Aron, 2000 for a review of the literature). Reduced form models that replace the rate of investment with variables that are thought to determine the rate of investment, allow the inclusion of institutional proxies which are also though to determine the rate of investment. Proxies for formal and informal institutions in the empirical literature include measures of institutional quality such as the enforcement of property rights, political stability and characteristics of political regimes and social capital.

The evidence of formal institutions is mixed but confirms the positive effects of political stability, contract enforcement and property rights on income growth (Aron, 2000), which are generally more applicable in international comparisons rather than inter-regional comparisons within developed economies such as the US. The evidence on informal institutions is even more mixed, but again the evidence points to the importance of trust in society (Knack and Keefer, 1997; Helliwell and Putnam 1995) which reduces transactions costs and contributes to greater market efficiency and confidence, and its catalytic qualities for unleashing potential gains from diversity (Kemeny, 2012). Associationalism, which was

shown to play a critical role in the development of Northern Italy in contrast to the South (Putnam and Leonardi, 1993), proved to be less applicable in broader contexts.

NEG models have contributed important insights to our understanding of economic development, albeit more for its elegant mathematical modelling of 'old' ideas than for its contribution of new concepts. These models essentially capture mathematically Marshall's observation back in 1890 that regions with larger populations generate benefits to firms and workers through better matching of skills to jobs, and greater scope of input-output linkages between firms (See Combes et al, 2008, for an excellent book on this family of models). They also capture and build upon early models of monopolistic competition (Chamberlin, 1951; Dixit and Stiglitz, 1977) and location theory (Coase, 1937; Kaldor, 1935 and 1970) whereby to some extent firms are shielded from price-cutting pressures through product differentiation and consumers' preference for variety, allowing competing firms to co-locate. They fall short however of capturing Marshall's third observation, that agglomerations generate positive externalities in the form of knowledge or 'secrets' which are 'in the air' (Marshall, 1890).

New Growth Theory developed models around the notion that innovation was the fundamental driver of long run economic growth (Lucas, 1988; Romer, 1986; 1994). This observation, based on the fact that knowledge is non-rival, only partially excludable and can potentially increase productivity of society at large, resonated particularly well at a time when NEG models highlighted the dampening effect of product differentiation on increased competition (Combes et al, 2008), and when global competition had increased tremendously over the course of the 1980s and 1990s due to lower trade barriers.

Economic geographers, not shackled by either a narrow disciplinary approach or the limitations of mathematical modelling, mixed and matched theoretical insights from a broad

and eclectic array of scholarly fields to develop a sophisticated conceptual model of economic development, especially at the regional scale (Scott, 1988; Storper and Walker, 1989; Storper and Christopherson, 1987; Storper and Scott, 1992, 1995 and 2007; Storper, 1992 and 1997). At the core of economic geographers' conception of economic development is the notion that specific types of knowledge pertain to specific industrial activities. Making tires and developing new varieties of tires requires a different set of skills, knowledge base, suppliers and specialized services to developing gear boxes or alternative forms of energy for engines. Moreover the skills and knowledge base pertaining to different industrial activities, and functions within industries, can be classified on a continuum from routine and codified to non-routine and tacit respectively (Autor and Murnane, 2003; Storper, 1997), which in turn determines firms' profit margins and consequently workers' wages. Cutting and sewing in the apparel industry requires more routine skills and codified knowledge than designing a high-end evening dress collection which requires non-routine skills and tacit knowledge. A cutter and sewer will thus earn less than a high-end designer within the same supply chain.

As economies emerged from the severe economic crises of the 1970s and countries began liberalizing their economies in the early 1980s, many firms and industries responded to market turbulence and increased competition through vertical disintegration. Industrial districts characterized by networks of small and medium-sized enterprises were proving their resilience to market uncertainties and enjoying higher incomes than their national economies (Bagnasco, 1977; Storper and Harrison, 1991; Cooke and Morgan, 1994; Brusco, 1986; Kristensen, 1992; Cooke and Morgan, 1994; Triglia, 1992). As a result some scholars declared the dawn of a 'new Post-Fordist' economy characterized by 'flexible specialization' (Piore and Sabel, 1984).

The California School (Scott, 1988; Storper and Scott, 1992, 1995 and 2007; Storper, 1992 and 1997) drew from a broad literature on industrial districts and Willamson's transactions cost theory and its antecedents (Coase, 1937; Williamson, 1981) to explain how firms in a context of falling transactions costs maximized their internal economies of scale and external economies of scope through vertical disintegration, and reduced idiosyncratic risks of transactions through propinquity. This elegant conceptual model explained the rationale behind vertical disintegration and industrial districts, consequently adding an additional centripetal force to agglomerations (idiosyncratic risk-reduction from propinquity).

The spatial implications of this conceptualization is the geographic sorting of firms in tradable industries through a fine-tuned matching of their intermediate and final trade costs and their specific demand for skilled workers with the cost structures, pools of skilled labor and other externalities of agglomerations. This in turn drives the industrial specialization and sectoral composition of regions, and consequently determines regional per capita incomes (Storper and Kemeny, 2012). Regions composed of industries whose firms employ workers that use tacit-forms of knowledge to develop innovative product varieties or entirely new product lines are said to be at the technological frontier. Such regions are composed of a relatively large proportion of highly-skilled and educated workers whose innovations generate high margins and consequently high wages.

The above conceptualization explains the sorting of firms from a static perspective, according to the nature and cost structure of their transactions with other firms, the innovativeness and margins of their output, and the specific skill-content of the labor force. In order to understand this conceptual model from a dynamic and evolutionary perspective, two additional elements must be incorporated: Knowledge creation, diffusion and innovation in

evolving industrial structures; and Schumpeterian entrepreneurship in a process of creative destruction.

Without these two additional elements, the above conceptual model would fall short of explaining changes in regional industrial composition, changes in specialization, and moves towards or away from the technological frontier over time. Rather the conceptual model would fall into the neo-classical 'trap' of pre-determining future industrial composition and consequently wages from initial factor endowments, and leaving little room for human choice, collective action and 'path formation' (Kenney and Von Burg, 2001). The shortcoming of static approaches to modelling is evident from the persistent residuals in growth regressions (Rodriguez-Pose, 2013).

Innovative products can be conceptualised as embodying knowledge and physical matter. Both are novel re-combinations of existing knowledge and matter (Romer, 1993). The knowledge component of commercially lucrative innovations is a non-rival and partially-excludable good, or a quasi-public good: While it benefits the innovator who applies it for commercial ends, the knowledge eventually seeps into the global knowledge pool and increases the productive capacity of society at large. It is precisely because of the non-rival nature of knowledge that it is recognized as the fundamental driver of long-run economic growth, and a source of economy-wide increasing returns (Mokyr, 1990; Romer, 1993). In addition to such non-pecuniary externalities from knowledge diffusion, the adoption of new technologies can generate pecuniary externalities in the form of productivity gains which cannot be fully appropriated by producers, as in the case of computers (Griliches, 1992). Without such social returns to innovation in the form of pecuniary and non-pecuniary externalities to innovation, constant economic growth cannot be sustained over the long run (Griliches, 1992-p. 29).

No firm could perpetually sustain the relatively high wages it must pay its highly-skilled workforce with the margins from the sale of a single innovation, as intellectual property rights expire and imitation sets in. The time it takes for non-routine tacit knowledge behind commercially lucrative activities to become routinized and imitated (commoditized), is characterized by the product life cycle (Vernon, 1966). The product life-cycle is essentially driven by the inevitable spillover and diffusion of new knowledge, which is non-rival and only partially excludable.

Knowledge spillover and diffusion however, especially at the early stages of development when it is in its most 'tacit' form, does not spread ubiquitously; rather it diffuses unevenly across space and across actors (people, firms and institutions) because it is sufficiently complex and un-codified that it can more easily be absorbed by people and firms with the appropriate prior related knowledge to assimilate it, and apply it to commercial ends (Cohen and Levinthal, 1990; Arrow 1962). Such transmission belts are facilitated by face to face contact, or what Storper calls 'untraded interdependencies' (Storper, 1997).

Paper-trail studies of patent citations and complementary research using alternative proxies for innovation at the aggregate regional scale attest to the geographic friction or 'stickiness' new knowledge encounters as it is produced and diffused (Jaffe, Tranjtenberg and Henderson, 1993; Jaffe and Tranjtenberg, 1996 and 1999; Sonn and Storper, 2008; Feldman, 1994a; Feldman, 1999).

Cohen and Levinthal's in-depth case studies of innovative firms identify sources of absorptive capacity, as well as channels through which new knowledge tends to flow. They show that the prior knowledge and experience needed for absorptive capacity can be gained through in-house R&D experience, production experience and advanced technical training of

personnel (Cohen and Levinthal, 1990-p. 2). Aggregate quantitative studies have shown the importance of universities and public R&D labs in regional knowledge production and diffusion (Jaff and Trajtenberg, 1996-p. 18), and in reviewing several such studies Feldman concludes that "[t]he basic results held: Geographic regions with greater amounts of knowledge-generating inputs produced more innovation" (Feldman, 1999-p. 4). These quantitative studies corroborate the common emphasis in a broad literature on the role of institutions in regional innovation systems (Nelson and Nelson, 2002; Lundvall, 1985 and 2010; Lundvall st Al., 2002; Freeman, 1995; Edquist, 1997 and 2001), industrial districts (Triglia, 1992; Piore and Sabel,1984), industrial clusters (Porter, 1996) and learning regions (Cooke and Morgan, 1994).

Cohen and Levinthal also shows that the source of new knowledge tends to cross departmental and organizational boundaries (i.e. flows within and between firms and institutions), and thus absorptive capacity depends on the nature of communication between the firm and the external environment and between subunits within the firm (Cohen and Levinthal, 1990-5). They argue that absorptive capacity increases with the diversity of knowledge structures between individuals who share sufficiently overlapping knowledge to enable effective communication (Cohen and Levinthal, 1990-p. 6), with intermeshed complementary functions (between design and manufacturing for example), and with individuals' awareness of the value of individuals within social networks, both within and outside the firm (Cohen and Levinthal, 1990-p. 7).

The complementarity of diverse albeit overlapping knowledge at the firm-level is also substantiated at the aggregate regional scale. Glaeser (1999) formally tests the relative importance of regional specialisation, diversification and competition in influencing the growth rates of industries in 170 US cities between 1956 and 1987. His findings contradict

the Marshall-Arrow model of localized externalities in support of Jacobs' theory of cross-industry knowledge spillovers (Jacobs, 1969) or urbanization externalities through inter-industry knowledge spillovers. Feldman and Audretsch, (1999) also found that innovation is more associated with diversity across complementary economic activities that share a common science base than specialization, consistent with both diversity and knowledge complementarily as sources of absorptive capacity. Furthermore they show that the degree of competition is also more conducive to innovation than monopoly power. Their results hold at both the geographic scale and at the level of the firm (Feldman and Audretsch, 1999-p. 19).

The innovation process is thus a collaborative process, despite the cut-throat competition that drives it and characterises the markets in which it operates. Actors in close geographic proximity to the source of innovation are thus more likely to possess the prior knowledge, relations with actors with diverse and complementary knowledge, experiences and consequently the absorptive capacity to collectively utilize new knowledge as it emerges, for innovation (Cohen and Levinthal, 1990). This explains why competitors collaborate as well as compete, as exemplified in Russo's detailed case study of the Italian tile industry. Russo identified the source of the industrial district's innovative capacity as the interrelation between firms as sources and channels of knowledge production and diffusion (Russo, 1985).

It follows that collaboration and competition between firms and institutions in a territorialized industrial structure is deeply embedded in social contexts of relations and conventions (Granovetter, 1985; Storper, 1997). Conventions are practices, habits, routines or customs that generate norms, regularities or patterns of behaviour in specific contexts. Storper describes conventions as "taken-for-granted mutually coherent expectations, routines, and practices" (Storper, 1995). Conventions can thus be conceived as the 'software' that can enable coordination between actors embedded in networks of social relations.

Granovetter's thesis about the social embeddedness of markets (Granovetter, 1985) is based on the fact that individual action is "embedded in concrete, on-going systems of social relations" (Granovetter, 1985-p. 8). Granovetter's embedded paradigm stresses the role of "concrete personal relations and structures (or "networks") of such relations in generating trust and discouraging malfeasance" (Granovetter, 1985-p. 11). More specifically, Granovetter argues that social life affects economic outcomes for three reasons: 1) Social networks affect the flow and quality of information which plays a critical role in economic outcomes. People rely on friends and people they know more generally to acquire information because it is often nuanced, subtle and difficult to verify; 2) Social networks, as proposed by the social capital literature, are an important source of reward and punishments; and 3) trust, the confidence others will do the right thing despite incentives to the contrary, emerges in the context of social networks, thus reducing transactions costs. These three social dimensions affect economic activity through their impact on labour markets, pricing, productivity and innovation (Granovetter 2005).

The idea that norms and conventions, or 'socio-relational' contexts, influence individual and collective actions has been the cornerstone of institutional economics since at least as far back as Walton Hamilton coined the term 'Institutional Economics' in 1918 at an American Economic Association meeting (Hamilton, 1919, cited by Hodgson, 2000-p. 317). Over half a Century later, in his seminal book "Economics and institutions", a critique of neo-classical economics published in 1988, Hodgson echoed turn of the 20th Century institutional economists such as Hamilton by calling for a deeper understanding of the psychology behind people's cognitive processes, which he and other institutional scholars argue would shed light on macro socio-economic phenomena. An institutionalist perspective

of economics is borne out of such an enquiry about the sources of individual and collective action.

Douglass North highlights the importance of ideology or belief systems in all 'socio-relational' contexts, which he defines as "the shared framework of mental models that groups of individuals possess that provide both an interpretation of the environment and a prescription as to how that environment should be structured" (Denzau and North, 1994vii-p.24). While distinct concepts, both belief systems and conventions are shared frameworks of mental models that provide prescriptions on how the environment should be structured in the case of belief systems, and prescription on how actors should behave in a way that is consistent with the shared belief system. Belief systems are arguably further 'up' the hierarchy of 'bundles of conventions' (of which socio-relational contexts are composed of), because their interpretive component shapes the 'bundle of conventions'.

Belief systems matter because they are the lens through which political and economic entrepreneurs interpret reality and shape the institutions that shape collective actions (including conventions). Institutions are the formal and informal constraints on people's behaviour in the form of formal rules and laws and informal conventions and relations. The latter has come to be known as social capital which Putnam defines as "features of social organization, such as networks, norms and trust that facilitate co-ordination and cooperation for mutual benefit" (Putnam, 1993-p.38).

Storper (Storper and Salais,1997; Storper, 1995) develop the concept of a 'world of production', characterised by unique conventions and relations (socio-relational contexts). As 'tinkering' individuals (Jacob, 1977) and start-ups experiment and learn, and as the industry grows and becomes established, the internally coherent system that emerges over time is one

of many possible coherent systems, and it "defines a common context of interpretation for those actors, which permits them to coordinate coherently with other actors in that context, under the specific conditions of uncertainty they must confront" (Storper , 1995-p. 8). This definition, by including the interpretive component of conventions, confirms the inclusion of belief systems in the 'bundle of conventions'. Common contexts (conventions for sure, and in some cases relations as well) operate across systems as well as within coherent systems. Storper refers to these interlinked systems as 'worlds of production' "in that they are frameworks of action for the economic agents involved" (Storper , 1995-p. 8).

Evolutionary economists also highlight the key role of conventions or norms in their theory about the evolution of the industrial life cycle (James Utterback and William Abernathy, 1975; Nelson and Winter, 2002). According to this theoretical strand, at the nascent stages of a new industry multiple players experiment in an uncertain but promising technological environment, essentially exploiting 'windows of locational opportunity' (Storper and Scott, 1987, 1992). Over time, after many failed investments in trial and error, survivors set a clear technological pathway which reduces the uncertainty of new product lines thanks to the emergence of dominant designs. It is at this stage that R&D investments in process innovation become feasible, raising the skills of existing firms, increasingly placing new-entrants at a disadvantage. At this stage lock-in sets in and a snow-ball effect of cumulative advantages shield the industrial agglomeration from competition. While entry slows exit continues to take place until a few large players dominate (Nelson and Winter, 2002-p. 13).

In the late stage of the industrial life cycle diversity is at its trough, and lock-in or path-dependence is at its peak, not least because of the path dependence of shared norms and conventions, thus maximizing the risks to incumbents, especially in cases where new

technology threatens the "architecture" of the system (as opposed to its components) (Henderson and Clark, 1990). Such threats come from competence-destroying technological change that renders existing skills and routines obsolete.

Not only does the knowledge at the early development stage of an industry become routinized, but technological advancement, especially skill-bias technological change (Bekman et al, 1998), also contributes significantly to the routinization of industries. According to economic geography this phenomenon drove the re-location of the durable goods manufacturing industry from the North East of the United States to the South in the 1960s. As production became increasingly routinized, due in no small part to technological change, and as transportation costs fell sufficiently, firms re-located to the cheaper regions of the South (Storper and Kemeny, 2012). The 'old' rustbelt manufacturing regions initially suffered unemployment and population declines until regions such as Boston, Washington and New York developed a critical mass of industries that utilized high-skilled labor to innovate and generate the margins which could sustain their high costs and high wages.

The external risk to the industrial system can also come from Schumpeterian entrepreneurial creative destruction, especially in contexts where competition is strongly based on innovation. In the science-based model the tendency for monopolies to dominate due to their disproportionate investments in R&D is thus counteracted by the possibility of small firms (with low R&D budgets) exploiting new 'windows of locational opportunity' (Storper and Scott, 1987) and leap-frogging larger firms by successfully developing and commercializing new technological innovations and catching-up in terms of size and R&D investments (Storper and Scott, 1987-p. 12). An example of this phenomenon is the emergence of the Hollywood entertainment industry in Southern California in the 1910s and 1920s away from its 'old' core in New York (Storper and Christopherson, 1987).

An industry's 'life cycle' need not entail an 'aging' process however, as "[r]enewal may come on the winds of the 'perennial gale of creative destruction' that Schumpeter celebrated (Nelson and Winter, 2002-p. 14). The 'intellectual world of production' (Storper, 1997), characterised by large firms and their in-house R&D operations, and the Schumpeterian 'tinkering' world of entrepreneurial experimentation with new technologies and new knowledge need not be in conflict, nor need they be geographically distant from one another.

New emerging technologies might be "competence enhancing" rather than "competence destroying" (Tushman and Anderson, 1986; cited by Nelson and Winter, 2002-p. 14). Alternatively their co-evolution could conceivably be characterised by both competence enhancing and competence destroying dynamics in a complex pathway of Schumpeterian competition evolving in symbiosis with the innovative intellectual world. New start-ups might enhance the competence of the 'intellectual world' in some respects (as sources of new technologies, human capital and business models for acquisition) and render conventions and technologies obsolete in other respects (through leap-frogging or game-changing technologies), as technological and industrial pathways unfold over time. From the perspective of the industrial structure, some industrial pathways will progress further down the technological frontier (through PBTL), others will become obsolete while still others emerge as entirely new industries (industrial genesis).

Silicon Valley is the quintessential poster-child of a regional innovation system characterised by these two 'worlds of production' evolving in symbiosis over time. The Bay Area's 'intellectual' world of production consists of existing high-technology firms with their in-house R&D departments and other institutions such as universities (Kenney and Von Burg, 2001-p. 5); the second experimental-entrepreneurial world consists of entrepreneurs and "a

loosely structured network of venture capitalists, lawyers specializing in high-technology, accountants, and consultants. Their intention is to facilitate the creation and growth of firms that can later be sold to larger firms or listed on the stock exchange, not to ship products" (Kenney and Von Burg, 2001-p. 5).

These two 'worlds of production' with their own institutions are intertwined because successful entrepreneurial ventures either become large well-established firms in their own right or are acquired by large existing firms; and large well-established firms and universities generate new knowledge and ideas which are the raw material for 'tinkering' and entrepreneurship. Moreover employees from large firms and students and Professors from universities often launch their own start-ups or spin-offs, thus directly feeding the entrepreneurial economy (Kenney and Von Burg, 2001-p. 131-132). Regional growth is thus a function of 1) the entrepreneurial economy which continuously combines and re-combines people and knowledge to generate ideas, business-plans, start-ups and prototypes which are the seeds of future firms and industrial pathways; and 2) the innovation that emerges from large well-established firms' process of Product Based technological Learning (PBTL) (Storper, 1997).

Common contexts operate across systems as well as within coherent systems (Storper, 1995). These two worlds of production, each with their own common contexts of conventions and relations, also form a coherent and overarching framework of action' (Storper , 1995-p. 8). Saxenian identifies an overarching regional 'culture' that distinguished Silicon Valley from Boston's Route 128 (Saxenian, 1996). Saxenian argued that Route 128 lacked the collaborative and experimental conventions typical of Bay Area firms and dealmakers that would enable the creative re-combination necessary to propel existing industries further down

their technological trajectories, and to exploit new technological opportunities and industrial pathways.

Saxenian's book thus identified two major differences which she highlighted to explain why Boston's Route 128 failed to be as resilient to its economic crisis as Silicon Valley: The absence of an experimental-entrepreneurial world of production in Route 128; and the dominant culture of the region's 'intellectual' world of production which was characterized by conventions and relations of secrecy and insularity. Moreover she argues that it is precisely because of the nature of these conventions and relations that characterised the dominant culture of the region that a 'tinkering' entrepreneurial economy failed to flourish as it did in Silicon Valley.

Saxenian attributes Silicon Valley's capacity to adjust to economic challenges to the porous, open, fluid and blurred boundaries between firms, both large and small; and to "the shared understandings and practices that unify a community and define everything from labor market behaviour to attitudes toward risk-taking" (Saxenian, 1996-p. 7), such as tolerance for risk and a "culture of change" (Saxenian, 1996-p. 38). As a result the region avoided the same fate as its products and industries at a highly disaggregated level of classification (due to product and industry life-cycles) by branching out into new areas of industrial specializations. When mass semiconductor manufacturing moved out of the region in the late-1970s (Saxenian, 1983), rather than have the cybernetic carpet swept from under its feet the region moved from producing chips to personal computers, followed by wave after wave of new specializations within the broad IT industry. Today the IT industry in the Bay Area produces "integrated circuits, software, computer networking equipment, computers, and a myriad of other electronics products" (Kenney and Von Burg, 2001-p. 5).

Each new wave at a very disaggregated level of industrial classification is essentially the branching out of the industrial structure into new industrial pathways or entirely new industries (industrial genesis). The chip manufacturing of the 1970s and the social media firms of the 2000s might be part of the same IT industry at an aggregate level of classification, but at more disaggregated levels of classification they are two entirely distinct industries, based on very different knowledge bases, skills and business models. The story of the IT industry in the Bay Area is thus not one of a single industry growing and prolonging its industrial life cycle, but rather a story of industrial genesis and industrial diversification along a high-road economic trajectory, albeit specialized in a very broad industrial category: Information technology.

In light of the intrinsic evolving socio-relational aspect of industrial development, right from the early stages of the industrial life-cycle when relations and conventions are being developed, the evolution of the Bay Area economy is as much a story of an evolving industrial structure as it is an evolution of institutions or 'worlds of production' characterised by highly effective conventions and relations. Economic sociologists with an interest in institutions, how they form and evolve have contributed in-depth insights into this process of new-industry formation, or industrial genesis.

The research of Woody Powell and his colleagues at Stanford University, designed to study the origins of institutions, offers a unique and detailed insight into the distinct path-ways early-stage innovations in a new emerging industry can take depending on the socio-relational contexts they emerge in and construct as they develop. These early-stage innovations in some cases lead to the emergence of highly successful industrial agglomerations, and in others have a much smaller regional impact, as Woody Powell and his colleagues show to be the case in the biotechnology industry (Powell et al, 2010).

They analyse the socio-relational contexts of 11 regions that seemed equally poised to develop leading biotechnology clusters, based on early innovations. They show that despite distinct beginnings, the three regions which successfully developed leading biotechnology clusters, San Francisco, San Diego and Boston, developed socio-relational features in common which contrasted with the eight regions that failed to develop leading clusters: New York, New Jersey, Philadelphia, Washington, North Carolina's research triangle, Houston, Seattle and Los Angeles.

The three success-factors highlighted in this ground-breaking research are diversity of organizational forms which "provides a rich soup in which practices, strategies and rules can emerge" from an experimental and learning process which "involves search, recombining, sense-making, and luck" (Powell, 2010-p. 12); the presence of an anchor tenant, a type of regenerative organization that does not compete directly with other types of organizations but rather "becomes scaffolding that, either intentionally or unexpectedly, assists subsequent connections and field formation… [and] continually recombines and repurposes diverse activities" (Powell, 2010, p. 13); and 'cross-network alignment' "such that ideas and models are transposed from one domain to another" (Powell, 2010, p. 14). As a result of such cross-realm transposition, when "one or more social relations are transposed from one network to another, and mix with the relations already present, raw material is created for invention" (Powell, 2010, p. 15).

The re-combination of knowledge, know-how, actors, corporate practices and conventions akin to industrial genesis is also discussed in "Manufacturing Possibilities" (Gary Herrigel, 2010), in the context of the evolution of the German, US and Japanese

manufacturing industries since around the mid-20th Century. Herrigel portrays industrial change as a "bottom-up, socially reflexive process of creative action". Action argues Herrigel:

> "is social, reflexive and ultimately creative. When their interactive habits are disrupted, actors seek to repair their relations by reconceiving them. Such imaginative interaction causes unforeseen possibilities for action to emerge. Creative actors rearrange, modify, reconceive, and reposition inherited organizational forms and governance mechanisms as they experiment with solutions to the challenges that they face. Creativity in the recomposition process makes, among other things, the introduction of entirely new practices and relations possible" (Herrigel, p.-2).

The socio-relational dynamics characteristic of industrial genesis in Woody Powell's research are also identified by Herrigel in an entirely different context (different countries and industries), at an entirely different stage of the industrial life-cycle (the restructuring of mature industries). At both the early stages of industrial genesis (US biotechnology) and at the mature stages of the industrial life-cycle (German, US and Japanese manufacturing), the re-combination of existing practices and actors to form new practices and relations are at the heart of successful collective responses to collective economic challenges and opportunities.

Complementary findings by Marianne Feldman and Zoller's recent research on high-end entrepreneurship (start-ups that make it to IPO-stage) sheds light on the role of key players in the process of social recombination from which start-ups emerge and grow to raise funds in IPOs (Feldman and Zoller, 2012). Feldman builds on a body of research which highlights the key brokerage role played by centrally positioned individuals who connect actors from different spheres in collective endeavours in general and in regional high-end

entrepreneurship[1] in particular (Dubini and Aldrich, 1991; Walker, Kogut and Shan, 1997; Burt, 2000, 2001) .

Feldman and Zoller refer to such key brokers whom they show to be disproportionately located in highly entrepreneurial regions as dealmakers, and describes them as individuals who "assume roles that make the connections from which knowledge spills over to lower the costs of engaging in innovative activity, thus creating regional vibrancy" (Feldman and Zolelr, 2012-p. 3). She contrasts the Bay Area which has 42 entrepreneurs for each dealmaker to Orange County which has 1,539 (Feldman and Zoller, 2012, p-17). The Bay Area had enough dealmakers to fill a football stadium. "These results suggest that that the chances of an entrepreneur having random contact with an influential dealmaker are 36 times more likely in San Francisco than in Orange County" (Feldman and Zoller, 2012-p. 17).

Feldman and Zoller's research shows the critical role played by centrally-positioned serial entrepreneurs, or dealmakers, who play the role of bringing together the right mix of people with the necessary mix of experience, knowledge and contacts so as to exploit new knowledge for commercial ends. These are analogous to the characteristics that give rise to absorptive capacity at the level of the region and the firm, namely the diversity of relevant prior knowledge and experience, brought together in unique combinations to absorb new knowledge, develop it further into innovations for lucrative commercial ends. Other research has shown how this 'dealmaker' role is also played by lawyers (Suchman, 2000), and VCs (Kenney and Florida, 2000) in Silicon Valley.

[1] The term high-end entrepreneurship is used here to distinguish between start-ups that strive to grow to become global leaders in a tradable industry from the majority of self-employed and small businesses that are either serving the non-tradable sector or have no ambition of growing to become global leaders in their area of specialization.

These detailed findings about cross-realm relations and the catalytic role of central dealmakers are consistent with observations made by scholars about Europe's industrial districts of Baden-Wurttemberg in Germany (Cooke and Morgan, 1994), West Jutland in Denmark (Kristensen, 1992), and Italian regions such as Emilia Romagna, Tuscany and Veneto, known as the Third Italy (Brusco, 1986, Cooke and Morgan, 1994, Triglia, 1992). Industrial districts argued Becattini are characterized by "the production of a sufficient number of workers able to act as a versatile interface among the district's various specialisms" (Becattini, 2002-p. 7).

Schumpeter (1934) defined entrepreneurial activity as the creation of new opportunities by recombining existing albeit hitherto unconnected resources for a new economic purpose, identified as the source of increasing returns in new growth theory (Romer, 1991). When resources lie in unconnected networks of individuals and organizations, 'bridging' relations between these networks could unleash untapped value by allowing for these resources to be combined in novel ways. This is re-combinatory process lies at the heart of 'transposition' in the genesis of new industries, and is brokered by dealmakers in highly-successful entrepreneurship.

Knowledge is thus produced, developed and commercially exploited through the coordination of diverse individuals, firms and institutions with the prior knowledge and experience that give them the absorptive capacity to recognise the value of new knowledge and to exploit it for commercial ends (i.e. to invent and innovate). These actors (individuals, firms and institutions) are organized in social structures (relations) with shared belief systems and norms (conventions) that facilitate the re-combination of resources, individuals, firms, institutions and organizational practices into novel institutional forms, be they the creation of new firms, the restructuring of old industries, or the branching out of the industrial structure

down new industrial pathways (industrial genesis). Conventions and relations within and across regional communities thus play an important role in the dynamic process of evolving industrial structures and consequently regional economic development and regional incomes.

THEORETICAL FRAMEWORK: THE RESEARCH QUESTION

The above literature review highlights the key role played by transposition-enabling conventions and relations in the dynamic evolution of the Bay Area's industrial structure; it also raises important questions about the historical *origins* and *scope* of its transposition-enabling socio-relational context.

Evolutionary economists have long recognized the co-evolution of various spheres in shaping innovation and industrial trajectories (Dosi et al, 2005). As Dosi and colleagues argue,

> "the revealed economic impact of technological innovation crucially depends upon some sorts of combinatorics, entailing "matching"/"mismatching" patterns between: a) the opportunities and constraints offered in any given period by the major available technologies; b) the structures and behaviors of business firms and c) the characteristics of broader institutions" (Dosi et al, 2005-p. 5).

Freeman (1995) argues that the study of economic development from a dynamic evolutionary perspective must shed light on the autonomous evolution and interactions between the spheres of science, technology, economics, politics and culture in order to understand the three dynamics of economic development: Forging ahead, catching up and falling behind (Freeman, 1995-p. 16).

Drawing from evolutionary economics and from the recent insights and theories from economic sociology on the role of transposition in the emergence of novel institutional forms (from new firms to new industries), this research aims to explore the role of broader regional informal institutions in the development of the Bay Area's industrial structure and its distinct socio-relational context. The research will focus on developments within the civic and political/cross-jurisdictional spheres over the course of the 20th Century, in order to assess how long-term developments in these two regional spheres together might have impacted the broader regional socio-relational context, and in turn industrial development and its specific socio-relational trajectory. To do so the concept of a 'transposition-enabling socio-relational context' for the purpose of this research is defined as follows.

DEFINITIONS

Drawing from the above reviewed literature, a transposition-enabling socio-relational context is characterized by two key institutional aspects:

1) Cross-realm relations (possibly enabled by brokers or an anchor tenant), and
2) Shared transposition-enabling conventions (to be defined/operationalized below).

A common relational feature that cuts across the research on high-end entrepreneurship (Feldman and Zoller, 2012), industrial genesis (Powell et al, 2010) and the restructuring of mature industries (Herrigel, 2010) is cross-realm relations. Cross-realm relations were also found to be a critical aspects of the relational infrastructure of innovation processes at the intra-firm level (Cohen and Levinthal, 1990), at the inter-firm level (Cohen and Levinthal, 1990; Russo, 1985; Storper, 1995; Scott and Storper, 1987), and at the level of the region or industrial district (Piore and Sabel, 1984; Triglia, 1992; Becattini, 2002; Storper and Harrison, 1991; Cooke and Morgan, 1994). A broad literature thus holds that cross-realm relations are a common feature of the socio-relational contexts that enable innovative

regions to develop and sustain their industrial structure at the technological frontier, and consequently maintain relatively high levels of income. Regional ross-realm relations can cross numerous boundaries including geographic/jurisdictional, industrial, institutional and class boundaries.

The research by Powell and his colleagues place cross-realm relations between actors from distinct communities at the heart of new institution-building during industrial genesis, and moreover highlight the enabling role played in this process by anchor tenants (Powell et al, 2010). The role of centrally-positioned brokers was also highlighted by Marianne Feldman's study of dealmakers whom she attributes to the success of highly entrepreneurial regions (Feldman and Zoller, 2010), consistent with the role of 'amphibious entrepreneurs' in the genesis of the biotech industry (Powell and Sandholtz, 2012). Cross-realm relations are thus deemed to be an intrinsic characteristic of a transposition-enabling relational context, and evidence of centrally-positioned anchor tenants or brokers/dealmakers act as catalysts of cross-realm relations within cross-cutting social structures (also consistent with the concepts of structural holes by Burt, 2000, 2001; and 'weak ties' developed in context of social embeddedness by Granovetter, 1973, 1985).

Measuring shared transposition-enabling conventions on the other hand is much more complex, not least because conventions come in 'bundles', and thus countless combinations of specific conventions can either enable or block cross-network transposition in countless unique contexts (Powell et al, 2010). The purpose of this research is *not* to identify specific strands or combinations of conventions that are deemed to be transposition-enabling; such a study would entail a separate (and fascinating) academic endeavour altogether (The literature on Silicon Valley has highlighted many observations about shared conventions but falls short of developing a theoretical model about transposition-enabling conventions).

Drawing from new institutional the challenge of determining the degree to which conventions across diverse realms are more or less likely to transpose is overcome by determining whether an aspect arguably necessary for cross-realm conventions to transposed, the perceptions and belief systems of agents, are widely *shared* economics (Denzau and North, 1994). Woody Powell observed that transposition leads to "a community of like-minded participants" (Powell et al, 2012-p. 31); a common belief system is arguably the minimum level of shared cognitive overlap in order for actors from across realms to develop 'like-mindedness'. Storper argues that common coherent contexts of interpretation within worlds of production also operate across worlds of production. Such a cross-cutting system "defines a common context of interpretation for those actors, which permits them to coordinate coherently with other actors in that context, under the specific conditions of uncertainty they must confront" (Storper , 1995-p. 8). Thus faced with uncertainty actors develop 'interpretive interdependence' (Storper, 1995-p. 7) as they learn to mutually interpret tacit, con-cosmopolitan knowledge. It follows that some form of widely-shared perceptions and belief systems (Denzau and North, 1994) act as the most basic 'common context of interpretation' that enable collective interpretations and consequently coordination between agents.

A regional transposition-enabling socio-relational context for the purpose of this study is therefore defined by the following characteristics:

1) Cross-realm relations (possibly enabled by brokers or anchor tenants), and
2) Widely shared perceptions and belief systems.

CASE SELECTION

This research study is designed to explore the scope and historical origins of the Bay Area's transposition-enabling socio-relational context. Rather than focusing exclusive

attention to this single case study, the analysis will be conducted as a comparative study of the Bay Area and Southern California over the course of the 20th Century. The reason for the comparative nature of this study is to substantiate the findings on the Bay Area, by contrasting them with a region that is presumed not to have an equivalent transposition-enabling socio-relational context.

By 1980 the Bay Area and Southern California metropolitan regions had both grown tremendously over the course of the 20th Century and were both at top of the US regional income hierarchy with very similar per capita incomes. Their industrial structures were also comparable, with similar shares of employment in IT, similar sophistication in their occupational task contents and similar patents per capita. Between 1980 and 2010 however, the two regions diverged substantially in their per capita incomes. A snapshot of the two regions' sectoral compositions in 2010 shows clearly the source of this divergence: While the Bay Area specialized in high-waged industries, with 11% of its employment in the IT industry, Southern California lost concentration in high-waged sectors, namely aerospace, and gained in low-waged sectors such as the logistics industry.

If the extraordinary performance of the Bay Area economy, driven by the evolution of its industrial structure, can be attributed to the transposition-enabling socio-relational context identified in the literature (as identified in the biotechnology industry, the entrepreneurial economy and numerous aspects of the IT industry), there is good reason to believe that Southern California lacked a comparable socio-relational context. This premise is substantiated in subsequent research. Moreover, by comparing the scope and origins of the Bay Area's institutional context with Southern California's, the Bay Area findings are 'substantiated by contrast', and Southern California findings can also add important insights to the general findings.

HYPOTHESIS

The research is designed to test the 'regional effect' hypothesis which claims that a) the Bay Area's widely-recognized transposition-enabling socio-relational context played an integral role in the region's extraordinary 1980 to 2010 income growth, b) is regional in *scope* (thus operates at a broader scope than those typically identified in the literature, such as university-industry relations, the brokering role of VCs, lawyers and serial entrepreneurs, and the brokered cross-realm relations in the biotechnology industry for example), and c) its *origins* can be traced to historical developments over the course of the 20th Century in the region's civic and political/cross-jurisdictional spheres. This 'regional effect' hypothesis is thus explored through by investigating three propositions, each reflecting the three aspects of the hypothesis. The three parts of this research are thus structured to explore each of these three propositions.

In order to set the stage for analyzing the scope and historical origins of the Bay Area's transposition-enabling socio-relational context, the research begins by examining the plausibility of the claim in the literature that the region's extraordinary economic performance could be conceivably attributed to the institutional aspects of its industrial structure. This is done by exploring non-institutional regional characteristics which the literature on regional economic development highlights as major determinants of income growth, and evaluating their relative explanatory power behind the divergence, and behind the Bay Area's extraordinary income growth over the 1980 to 2010 period. This study is conducted in Part I and is designed to explore the plausibility of the following proposition:

Proposition 1*: The Bay Area's extraordinary 1980 to 2010 income growth cannot be sufficiently explained by widely-recognized major regional income-growth related*

characteristics, thus substantiating the claim in the literature about the role of the region's socio-relational context.

The study in Part I begins with a theoretically-guided analysis of regional characteristics which might plausibly explain the divergence in per capita incomes of LA and the Bay Area between 1980 and 2010. The analysis is structured in two sections; the first draws from economic geography and regional science/urban economics to identify a few major income growth-related characteristics which might explain the economic trajectories of the two regions over the divergence period. An in-depth analysis of each of these factors, across the two regions and with reference to the US average in some cases, is conducted to gauge their explanatory power. The advantage of a two-case comparison with occasional reference to the US average or other US regions is that factors can more easily be ruled out if they are found to be very similar across the two regions, with other US regions acting as an additional benchmark for comparison.

The first section argues that the primary driving force of the divergence and of the Bay Area's extraordinary income growth is primarily driven by the evolution of the industrial structure, which cannot be explained by major income growth related characteristics in the analysis. The explanatory power of these major factors are further explored in the second section of Part I, by conducting a regression analysis that holds proxies of these identified variables constant. This reveals the relative income growth of the Bay Area and Southern California with relation to US regions with comparable major income growth-related characteristics identified in the first section of Part I.

Part I thus presents an argument that widely-recognized major income growth-related characteristics cannot explain the extent of the divergence, and the extent of the Bay Area's

1980 to 2010 income growth. The analysis shows that the fundamental up-stream determinant of the divergence was the evolution of the industrial structure and its consequent implications on labor demand in the two regions. This sets-up the case for an in-depth analysis of the scope and historical origins of the two regions' socio-relational contexts, for their theorized and plausible roles in the industrial evolution of the two region's industrial structures over the divergence period. By ruling out the major income growth-related characteristics as sufficient fundamental determinants of the Bay Area's extraordinary income growth, Part I essentially substantiates the claim in the literature that the Bay Area's extraordinary economic performance is plausibly attributable to its socio-relational context, whether characterized by university-industry relations, brokered cross-realm relations, a critical-mass of 'amphibious' serial entrepreneur dealmakers, the central role of VCs and lawyers, attitudes towards risk and spin-offs, and other highly-recognized features of the Bay Area's institutional infrastructure.

Having substantiated the plausibility of the role of such institutional aspects of the Bay Area's industrial structure in the region's industrial evolution and consequently extraordinary economic performance between 1980 and 2010, the research in Part II is designed to explore the *scope* of the Bay Area's transposition-enabling socio-relational context over the divergence period (1980 to 2010). The literature on the Bay Area economy and on Silicon Valley highlights numerous scopes within which cross-realm relations and transposition is evident: University-industry relations with Stanford playing a key role as broker or anchor tenant, VCs and Lawyers, brokered cross-realm relations in the biotech industry and high-end entrepreneurship through dealmakers for example. The research in Part II broadens the investigation to two scopes of analysis in search for a regional transposition-enabling socio-relational context: The high-end corporate social structure, which includes a

diversity of industries across a broad geographic intra-regional landscape; and society at large. The former is analyzed using network analysis of directorate interlocks for gauging the degree of cross-realm relations (across industries and cities), and archival research of publications by representative organizations for gauging the degree of widely-shared belief systems across this high-end corporate social structure. The latter (the broader society at large) is analyzed using widely-recognized social capital measures, namely generalized trust and civic association. Part II is thus designed to explore proposition 2 as follows.

Proposition 2*: The Bay Area's transposition enabling socio-relational context is evident across its high-end corporate social structure, and its scope extends beyond the industrial structure to society at large.*

The research in Part III, using a combination of literature reviews and anecdotal evidence from interviews is designed to explore the historical *origins* of the Bay Area's transposition-enabling socio-relational context from historical developments in the region's civic and political/cross-jurisdictional spheres. The analysis begins by reviewing the thesis proposed by Fred Turner about the cross-cultural transposition behind the IT industry's techno-socio-relational trajectory. This thesis highlights the role of the region's counterculture in the evolution of the IT industry. An important dimension of the Bay Area's counterculture in the 1960s and '70s is an ecological consciousness which can be traced back to developments in the region's environmental movement since the last decade of the 19th Century. An analysis of the Bay Area's highly dynamic, experimental and cross-cutting environmental movement, together with the free-speech and anti-war movements in the 1960s, attest to the region's transposition-enabling socio-relational context within its civic sphere, one which cut across class and geographic boundaries. The absence of a cross-cutting civic movement in Southern California substantiates the Bay Area findings.

The analysis then turns to the political/cross-jurisdictional spheres of the two regions, by comparing major regional projects and initiatives since the beginning of the 20th Century. Cross-jurisdictional coordination around regional initiatives builds cross-realm relations and widely-shared perceptions and belief systems. The analysis shows how the two regions diverged significantly in their propensities for regional coordination in the mid-1900s, when regional initiatives began to increasingly require greater cross-jurisdictional coordination. The analysis thus reveals that developments in the political/cross-jurisdictional sphere, in addition to developments in the civic sphere, developed cross-realm relations and widely-shared beliefs in the Bay Area, which offer some evidence in favor of the 'regional effect' hypothesis, which states that a regional socio-relational context played an important role in shaping the development of the Bay Area's industry-level socio-relational context, and consequently its industrial evolution. Part II is thus designed to explore the plausibility of proposition 3 which states the following.

Proposition 3: *The Bay Area's transposition-enabling socio-relational context can be traced back to historical developments in civic and political spheres.*

The final section discusses the findings in this three-part research by triangulating between the various findings, and discussing how these findings fit in to the existing 'stories' of how the Bay Area's economy developed into the highly innovative and regenerative entrepreneurial economy it is known for today. Finally a few recommendations for future research and policy implications are also discussed.

PART I – THE CASE FOR A SOCIO-RELATIONAL CONTEXT

The purpose of this first of three parts is to show that the per capita income divergence of the Bay Area and Southern California economies between 1980 and 2010 was predominantly driven by the evolution of the two regions' industrial structures, which cannot be sufficiently explained by theoretically-derived major initial regional characteristics (or factor endowments). The analysis will also show that the divergence is primarily a result of the Bay Area's extraordinary income growth over the period, which was a function of its increasingly large education premium (demanded by its increasingly innovative industrial structure). This analysis will thus substantiate the premise behind subsequent research that the Bay Area's extraordinary income performance was to a great extent plausibly driven by its widely-recognized transposition-enabling socio-relational context.

The analysis will also highlight LA's average income growth over the period, which implies its lack of transposition-enabling socio-relational context (to be substantiated in Parts II and III). This assumption about LA's socio-relational context does however pose a challenge, which is that of exogenous shocks. What if the 1990s economic crisis hit the Southern California region much harder than any exogenous shock in the Bay Area, because of the nature of the crisis and the regions' characteristics? For example, Southern California was disproportionately exposed to the manufacturing crisis that hit the US, due to its high share of light manufacturing employment, and its aerospace industry in which it was also highly specialized also experienced a negative demand-shock due to its disproportionate exposure to a single client, the Federal government, which directed contracts to other regions in the early 1990s.

One could quite rightly argue that LA might very well have had a similar transposition-enabling socio-relational context as the Bay Area, but in light of its larger exogenous shock was nevertheless unable to overcome its economic challenges as the Bay Area had done in the face of 'milder' crises (such as the crisis in the early to mid-1980s due to competition by the Japanese, and the dot-com bust in 2001). Previous research, together with findings in Parts II and III however, offer a great deal of evidence that a transposition-enabling socio-relational context was absent in Southern California between 1980 and 2010.

Turning to such evidence in the literature, the research by Woody Powell and his colleagues in economic sociology show how Southern California did not develop a leading biotechnology cluster as the Bay Area, Boston and San Diego had done, despite equally promising beginnings including the existence of Amgen, one of the largest biotechnology firms in the world (Powell et al, 2010). This they argue is because the firm did not connect with diverse communities, namely entrepreneurs and the academic sphere. It might very well be due to the absence of a transposition-enabling socio-relational context in the region. Unlike the numerous examples of university-industry relations in the Bay Area, which have spawned many high-profile start-ups that have grown into globally-renowned corporations and developed highly innovative inventions, such as Hewlett-Packard and Varian Associates (Kenney and Von Burg, 2001), Southern California never developed a reputation for university-industry relations which forthcoming research by Casper confirms (Casper, Forthcoming). Research by Feldman and Zoller contrast the high-number of dealmakers in the Bay Area's high-end entrepreneurial economy with a relatively low number of such cross-realm brokers in Southern California (Feldman and Zoller, 2012). While research highlights the important central role played by VCs (Kenney and Florida, 2000) and lawyers (Suchman, 2000) in the Bay Area, no equivalent research has revealed comparable dynamics

in Southern California, except of course those restricted to the entertainment industry (Christopherson, 2006).

A recent historical case study conducted on the entertainment industry in Southern California highlights the highly entrepreneurial nature of the industry, its resilience and adaptation in the face of exogenous shocks since its emergence in the 1910s and its transition into a flexible 'new economy' form of organization in the 1970s, characterized by a large number of dealmakers including lawyers and other brokers in combining and re-combining people, firms and institutions on a project by project basis. The case study also shows however that the transposition-enabling socio-relational context within the entertainment industry does not extend to the broader industrial structure, whether due to incompatible technologies (art and engineering for example) or other sources of fragmentation, and raises doubts about the industry's more recent adaptation capacities to the 'new economy' (Storper et al, Forthcoming).

Widely-shared conventions such as attitudes to risk and failure characteristic of the Bay Area's industrial structure have attracted a great deal of scholarly attention (Saxenian, 1996; Kenney, 2000); Southern California on the other hand never attracted scholarly attention for widely-shared conventions. In fact it is more likely that conventions in Southern California do not encourage cross-realm relations due to the conventional characteristics of its industrial structure which is has come to be dominated by mass-production houses in numerous industries including insurance, residential mortgages, aerospace (which had long lost its 'tinkering' origins since the days of Howard Hughes), home-building, branch-plant consumer durables production, oil refining and its large port complex (Storper et al, Forthcoming).

Additional evidence in support of the premise that Southern California lacked a transposition-enabling socio-relational context is further substantiated by findings in Parts II and III of this research. Of course this does leave the question of whether an equivalent socio-relational context in Southern California would have been sufficient to overcome or lessen the region's challenges. The reader will be the ultimate judge of this question, although it will be the subject of discussions in the concluding chapter of this dissertation. Suffice to say at this stage that theory holds that the region would have better exploited technological and commercial opportunities and consequently steered its industrial structure through high-end entrepreneurship (Feldman and Zoller, 2012), industrial restructuring (Herrigel, 2010) and industrial genesis(Powell et al, 2010) .

The arguments and analyses will be presented using two complementary research methods: In the section that follows, the likely impact of a few theoretically-derived and widely recognized income growth-related characteristics back in 1980, and in some cases their changes over time, are explored. By comparing them across the two regions and in some cases to the US average, their relative explanatory power will be discussed and assessed. In the second section proxies for these characteristics are regressed against income growth over the period for regions across the US, to substantiate the arguments and conclusions in the first section, that theoretically-derived major income growth-related characteristics cannot explain the extent of the Bay Area's extraordinary income growth over the 1980 to 2010 period.

CHAPTER 2: REGIONAL CHARACTERISTICS

"Shifts in the production function are predominantly driven by compositional shifts in the pattern of investment activity"
(Rosenberg, 1967-p. 11)

The year 1980 is widely recognized as the "nexus between two main tendencies: the geographical shift in the old manufacturing economy, and the rise of the 'new' economy" (Storper and Kemeny, 2012-p. 4). Regions all over the world faced the challenge of responding to the great economic challenges and opportunities that presented themselves over the course of the following three decades. One common response across most economies was economic restructuring, whereby firms and industries responded to changes in transactions costs and opportunities from technological innovations such as the telecommunications revolution, computing, robotics and other skill-bias technological change, through numerous locational and strategic considerations (Storper, 1997).

As discussed in the above literature review, the Bay Area economy (its people, firms and institutions) responded extraordinarily well to these challenges by branching out into new and highly innovative and commercially lucrative industrial pathways, both within the broad category of IT (and its associated high-end services) and the new industrial category of biotechnology. Through the interaction of people, firms and institutions in two distinct but related worlds (Kenney, 2000), the 'tinkering' entrepreneurial world and the 'intellectual' world of well-established firms, collaborations between diverse actors absorbed new knowledge, developed innovative ideas, technologies and business plans, and successfully exploited those for lucrative commercial ends. As a result the region maintained its position at the top of the US regional income hierarchy over this highly contentious period of

transition, from the Fordist to the 'new' economy (see table 1a and 1b below for 1980 and 2010[2] rankings respectively, constructed using BRR[3] data).

Table 1.a: US metropolitan regions with per capita incomes greater than LA, 1980.

Regions with pci>LA (of 53 regions with 2010 pop>1M)	**pci**	**Rank**
San Francisco-Oakland-San Jose, CA (C)	**9,312**	**1**
Washington-Baltimore, DC-MD-VA-WV (C)	8,981	2
Houston-Galveston-Brazoria, TX (C)	8,797	3
Denver-Boulder-Greeley, CO (C)	8,723	4
Seattle-Tacoma-Bremerton, WA (C)	8,702	5
Minneapolis-St. Paul, MN-WI	8,543	6
Chicago-Gary-Kenosha, IL-IN-WI (C)	8,447	7
Detroit-Ann Arbor-Flint, MI (C)	8,388	8
Los Angeles-Riverside-Orange County, CA (C)	**8,360**	**9**

Table 1.b: US metropolitan regions with per capita incomes greater than LA, 2010.

Regions with pci>LA (of 53 regions with pop>1M)	**pci**	**Rank**
San Francisco-Oakland-San Jose, CA (C)	**37,974**	**1**
Washington-Baltimore, DC-MD-VA-WV (C)	37,938	2
New York, Northern New Jersey, Long Island, NY-NJ-CT-PA (C)	34,298	3
Seattle-Tacoma-Bremerton, WA (C)	33,175	4
Hartford, CT	32,882	5
Minneapolis-St. Paul, MN-WI	32,775	6
Boston-Worcester-Lawrence, MA-NH-ME-CT (C)	32,361	7
Denver-Boulder-Greeley, CO (C)	31,522	8

[2] The figures reported as 2010 are in fact the average of 2005-2009 census data, referred to henceforth in this chapter only as 2010 for ease of communication.

[3] A project of the Building Resilient Regions Network, funded by the John D. and Catherine T. MacArthur Foundation. Manuel Pastor, Justin Scoggins, T. William Lester, Karen Chapple, Building Resilient Regions database [Machine-readable database]. Los Angeles, CA: The USC Program for Environmental and Regional Equity (PERE).

San Diego, CA	30,705	9
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD (C)	30,481	10
New London-Norwich, CT-RI	30,409	11
Chicago-Gary-Kenosha, IL-IN-WI (C)	30,058	12
Raleigh-Durham-Chapel Hill, NC	29,638	13
Austin-San Marcos, TX	29,531	14
Richmond-Petersburg, VA	29,256	15
Sacramento-Yolo, CA (C)	28,988	16
Atlanta, GA	28,830	17
Providence-Fall River-Warwick, RI-MA	28,282	18
Kansas City, MO-KS	28,194	19
Charlotte-Gastonia-Rock Hill, NC-SC	28,122	20
Milwaukee-Racine, WI (C)	28,004	21
Portland-Salem, OR-WA (C)	27,902	22
St. Louis, MO-IL	27,720	23
Dallas-Fort Worth, TX (C)	27,717	24
Nashville, TN	27,576	25
Los Angeles-Riverside-Orange County, CA (C)	**27,525**	**26**

Source: Author's calculations using BRR data.

Southern California is a highly successful and diversified region which achieved spectacular population growth since the turn of the 20th Century, and by 1980 enjoyed a per capita income that was 90% that of the Bay Area's, equivalent to a difference of just $950 per capita. The average Bay Area citizen earned $9,300 compared to $8,360 in LA, and both regions were amongst the top-10 earning US regions with a 2010 population greater than $1M (see table 1a above). By 2010 Southern California per capita income was about $27,500,

a staggering $10,500 per capita[4]less than the Bay Area, moreover had slipped substantially down the US regional income hierarchy from 9th place in 1980 to 29th place in 2010. LA's income relative to the Bay Area had slipped from 90% to 70%, a staggering divergence in incomes over a thirty year period of two highly advanced economies.

An economist would be absolutely right to argue that the Bay Area and Southern California's 1980 to 2010 income growth was a function of 1980 regional income growth-related characteristics and 'exogenous shocks' over the period. There is absolutely no doubt that to a great extent, regional characteristics back in 1980 played a significant role in determining regions' income trajectories over the subsequent three decades.

Since Robert Barro's seminal econometric models (Barro, 1991), many studies have explored the relative effect of numerous initial characteristics of economies on the rate of economic growth (Sala I Martin, 1997). These studies typically built on Barro's initial findings that showed the positive and significant impact of education (typically used as a proxy for the 'quality' of human capital (Barro, 1991)), and the negative and significant impact of initial incomes on the rate of growth of per capita GDP. Furthermore, consistent with neo-classical theory, the rate of education was found to be negatively correlated with ratio of physical investment to GDP. Finally, Barro found a negative relationship between the share of government consumption in GDP and productivity growth (i.e. per capita GDP). Barro's seminal work and subsequent research confirm the significant impact of these and many other variables on growth (Sala-i-Martin, 1997).

[4] The data in this chapter, unless specified otherwise, is from the publicly available BRR database hosted by Manuel Pastor at USC. The data is derived from the census, and is presented at the CBSA scale. In light of the metropolitan regional scale of this research, CBSA-scale data was aggregated into broader CMSA scale data.

The purpose of this chapter is not to test the impact of a broad array of regional characteristic on the growth of US regions since 1980, and comparing LA and SF across each of these characteristics. Such an endeavour is not necessary for the purpose of this study because even if 60 variables and two-million combinations of variables have been shown in one specification or another to have a significant effect on growth (Sala-i-Martin, 1997), most of those are either irrelevant at the US cross-regional scale (such as measures of enforcement of property rights, openness to trade and the rule of law – which are more apt at explaining inter-national differences), or they are clearly not important enough (their effect is too small even if found to be significant in some models) to act as key determinants of growth across US regions, and to explain the Bay Area's spectacular economic performnace. This is akin to Sala-i-Martin's recommended strategy of explicitly declaring a 'true model' (i.e. those variables for which sufficient theoretical rationale exist to insure their inclusion). Rather than ascribing to a single theory such a list of 'true variables' was selected from the following theories on regional economic development: Regional Science/ Urban Economics (RSUE), and Economic Geography.

These two schools of thought offer very different conceptual models on how regional incomes grow over time[5]. While economic geographers attribute income growth[6] to the industrial structure, and thus on skills, education and population size (albeit more in the NEG literature), RSUE emphasise housing costs (and amenities in general) and their impact on population growth and income growth rates.

[5] Economic geography was discussed in detail in the literature review, thus more time is devoted to describing the theoretical rational behind US Urban Economics/Regional Science.

[6] While international growth regressions typically measure the relative impact of factors on the growth of per capita GDP, cross-regional studies typically measure per capita income growth.

Urban economists and regional scientists, especially in North America (Partridge, 2010), conceptualize of a world where workers and household migrate between regions so as to maximize their utilities, which they measure by deducting housing costs and other amenities from nominal incomes. This model is formalized in a 'general spatial equilibrium' model (Glaeser, 2009) that predicts real-income equalization across regions. As shocks (such as changes in land-use regulation that change housing costs) disrupt the equilibrium, firms and workers respond by maximizing their utilities (I.e. by voting with their feet), which they achieve by optimizing their nominal wages, housing prices and other un-priced amenities through new locational decision. At the risk of over-simplifying, regions with high nominal incomes will tend to have high housing costs (thus equalizing real incomes with regions with lower nominal incomes and lower wages), which in turn locks-out less-educated and skilled migrants, thus steering the industrial structure towards more innovative and high-waged trajectories.

Economic geographers on the other hand, whose conceptual models were discussed in detail in the literature review, consider centripetal forces which reduce the mobility assumption akin to RSUE models. Moreover, such centripetal forces territorialize firms and workers, especially at the more innovative end of the spectrum, in specific and unique positive externalities from propinquity. Workers and firms are thus less mobile than is assumed in RSUE (due to their need to specifically match their skills to skill-specific employment demands across regions), and therefore from an economic geography perspective the driving force behind the regional sorting of migration streams and regional incomes is the evolving industrial structure and its distance from the technological frintier (Storper, 1995, 1997; Scott,1987).

Drawing from the above two dominant regional growth models, the following five aspects of the two regional economies are analyzed and compared in this first section of this chapter: Population and population growth rate, migration, housing costs, education, and industrial composition.

POPULATION

As discussed in the above literature review, increasingly sophisticated modelling techniques have successfully broken down the old neo-classical restrictions such as constant returns to scale, perfect competition and diminishing returns to increases in the capital-labor ratio. The long-held notion in economic geography circles that agglomerations (Marshall, 1890; Storper, 1997; Scott, 1988) generate positive pecuniary externalities to scale are now recognized and incorporated into quantitative neo-classical models (Krugman, 1991; also see Combes et al, 2008 for an excellent textbook on this family of NEG models). Yet despite this recognition what is still open to debate is the minimum population threshold for minimum scale economies. Moreover, various scale thresholds apply to different industries and sectoral compositions. Two-hundred thousand people might meet minimum scale thresholds for some industry but not others, but then this raises the question of Jacobian externalities, or positive externalities from the specific mix of industries in a region (or synergy), which further complicated the question of minimum scale economies from population size.

Back in 1980 both regions were above both single-industry (localization externalities) and Jacobian thresholds of population size, whatever these may have been. As shown in table 2 below, the Bay Area and Southern California regions ranked 2nd and 7th most populous regions in the US, out of 178 regions with 2010 population greater than 200,000.

Table 2: *LA and SF population levels, growth rates and rankings, 1980-2010.*

Pop>200,000 (n=178)	**LA**	**SF**
Population 1980	11,500,000	5,388,466
Population Size Ranking 1980	**2**	**7**
Population 2010	17,600,000	7,256,914
Population Size Ranking 2010	**2**	**6**
Absolute Pop increase 1980-2010	6,100,000	1,868,448
Ranked absolute pop increase '80-2010	**1**	**10**

Source: Author's calculations using BRR data.

Theoretically therefore, a rationale for why the Bay Area's 5.4 Million citizens would have placed the region at an advantage over Southern California's 11.5 Million in terms of income growth over the subsequent three decades is not apparent from theory. Moreover the two regions' growth rates were also comparable, with LA increasing its population by 53% between 1980 and 2010 and the Bay Area by 35%, with both regions maintaining their relative population rankings in the US as a whole (see table 2 above). In absolute terms however, LA added more people to its region than any other US region over the period, increasing its population by over 6 Million people, a staggering absolute population growth. The Bay Area added almost 2 Million people, which relative to its 1980 population of over 5 Million people structurally positions the region as a high population-growth region, ranking as the 10th fastest growing region in the country.

As discussed above, RSUE attribute population growth to relatively cheap housing costs, which in their general equilibrium model coincides with lower nominal wages. In other words although the model does not place the sequence of responsibility of lower nominal incomes on high population growth (population growth is an outcome), it does result in an inverse relationship between the two, due to the role of housing costs, which we turn to next.

HOUSING COSTS

From an RSUE perspective (Graves, 1983, Roback, 1982, Glaeser and Gottlieb, 2009, Partrige, 2010), housing costs are a plausible driver of wages in LA and the Bay Area. According to this line of reasoning, more restrictive zoning or land-use regulation in the Bay Area would have restricted regional in-migration to higher-skilled workers whose relatively higher wages can afford the region's relatively high housing costs, which in turn would drive the industrial structure down a high-road trajectory (as lower-skilled workers are effectively priced out of the region), and thus increasing the nominal wage in the Bay Area. In other words the Bay Area's extraordinary income growth over the period is due to land-use restrictiveness, according to this theoretical line of reasoning.

In order to test this theory Tom Kemeny, as part of a forthcoming book (Storper et al, Forthcoming), compared the level of land-use regulation across the two regions using four different methods to corroborate his findings. The authors triangulate between the different findings and conclude that "differences in the ability to develop land and housing do not appear to have played an important role in the evolution of wage disparity between Los Angeles and San Francisco. The available measures suggest that, in the national context, both regions have high levels of land use regulation" (Storper et a, Forthcoming).

To test whether nominal incomes in 2010 in the Bay Area and Southern California erode nominal income differences, *real* incomes[7] were calculated for LA and the Bay Area in 1980 and 2010 (see table 3 below). Results show that the nominal income findings hold even after deducting a proxy for housing costs.

[7] The CBSA 'share of median household income' on rent was aggregated to the CMSA metropolitan scale by population-weighting, and deducted from nominal per capita income to estimate a proxy for *real* per capita incomes.

Table 3: *'Real' per capita income, LA and SF, levels and rankings, 1980-2010.*

Regions with 2010 pop>200K (n=178)	**LA**	**SF**
Real Per Capita income 1980	$6,143	$6,971
Ranking 1980	**23**	**2**
LA/SF	**88%**	-
Real Per Capita income 2010	$18,392	$26,715
Ranking 2010	**68**	**2**
LA/SF	**69%**	-

Source: Author's calculations using BRR data.

This calculation is admittedly crude, due to the aggregation method, the exclusive use of rental share estimates and the application of household share of income on rents to per capita incomes. A much more precise micro-data analysis was conducted by Tom Kemeny using 1% IPUMS Decennial samples, in 1970, 1980, 1990 and 2000, and on the American Community Survey for 2005-2008, using CMSA boundaries for San Francisco and Los Angeles (Storper et al, Forthcoming). Results from this micro-data analysis corroborate the general findings from the aforementioned crude method. Findings from the micro-data in fact augment the income gap between LA and the Bay Area; they show that the median Bay Area household earned double the real wage and salary income than the average Southern California household, and about 30% more than the average household in New York, Boston, Chicago and Washington (Storper et al, Forthcoming). The Bay Area's spectacular 1980-2010 income growth holds even after housing expenditures are deducted from nominal incomes.

In light of the Bay Area and Southern California's very similar construction restrictions, and *real* income wage divergence, it would appear that land-use regulation and consequently housing costs did not plausibly play a principle role in the economic trajectories of the two

regions. It is thus more plausible that nominal wages were driven by factors other than housing costs, such as human capital which are examined next (by analyzing educational attainment).

EDUCATION

Innovative high-waged regions demand workers with high educational attainments, and educated workers choose to live in regions where innovative firms and industries can afford to pay them relatively high wages (i.e. where they can be more productive). Moreover, due to increasing returns from education (Lucas,1988; Romer, 1989), and due to the absorptive capacity (Cohen and Levinthal, 1990) from 'learning by doing' (Arrow, 1969), regions with higher shares of workers with high educational attainment are expected to grow faster over time.

Tables 4a and 4b below shows that back in 1980, the Bay Area had an education-share advantage with 27% of workers active in the labor force possessing a college degree compared to 19% in Southern California. The LA region also had a larger share of workers with only some high-school education. These differences however were not very large, and the two regions had almost identical shares across the two other educational categories. As far as one would expect college graduates to earn higher incomes than workers with just a high school degree, these differences in shares in educational attainment are consistent with the fact that LA's per capita income was 90% that of the Bay Area's in 1980.

Over the course of the divergence period the share of workers with a college degree grew much more in the Bay Area than in Southern California. By 2010 over 50% of workers in the Bay Area had a college degree, compared to just below 30% in Southern California, an astounding difference. Moreover the share of workers with only some high-school education

fell more in the Bay Area, so that by 2010 a mere 7% of Bay Area workers had only some high-school education compared to 15% (double the share) in Southern California.

Table 4a: *Shares of educational attainment amongst workers active in the labor force, LA-SF, 1980 to 2010.*

	1980		**1990**		**2000**		**2010**	
	LA	**SF**	**LA**	**SF**	**LA**	**SF**	**LA**	**SF**
LA/SF - College Graduates	**19%**	**27%**	**23%**	**37%**	**23%**	**43%**	**29%**	**52%**
LA/SF - Some College	26%	28%	34%	34%	24%	23%	25%	21%
LA/SF - HS Graduates	33%	30%	25%	20%	33%	23%	31%	19%
LA/SF - Some HS	**22%**	**15%**	**18%**	**9%**	**20%**	**10%**	**15%**	**7%**

Source: Tom Kemeny's calculations from IPUMS data (Storper et al, Forthcoming).

Tale 4b: Share of Bay Area educational attainment minus LA share, 1980-2010

	1980	**1990**	**2000**	**2010**
SF-LA College Graduates	8%	14%	20%	23%
SF-LA Some College	2%	0%	-1%	-4%
SF-LA HS Graduates	-3%	-5%	-10%	-12%
SF-LA Some HS	-7%	-9%	-10%	-8%

Source: Calculations using Tom Kemeny's calculations from IPUMS data (Storper et al, Forthcoming).

The difference in workers' incomes by educational attainment over time (see table 5) shows that the growth in the relative share of college graduates in the Bay Area coincided with a massive education premium over equivalent workers in LA. Workers' wages were very similar across all education attainment categories back in 1980, but by 2010 the average college-educated Bay Area worker earned over $21,000 more per year than his or her Southern counterpart, despite the growth in the share of college graduates in the Bay Area's active labor force.

Table 5: *Absolute wage difference between the average income of workers active in the labor force in LA and SF by educational attainment, 1980, 1990, 2000 and 2010 (SF minus LA).*

	1980	**1990**	**2000**	**2010**
College Graduates	-$427	$1,080	$15,692	$21,372
Some College	-$71	$337	$6,395	$5,672
HS Graduates	$567	$634	$4,030	$3,103
Some HS	-$454	$270	-$648	-$238

Source: Source: Tom Kemeny's calculations using IPUMS data (Storper et al, Forthcoming).

If such a massive education premium was not driven by the sorting of immigration streams due to government restrictions on housing construction, then what is likely to have sorted immigrants by educational attainment? Having shown in the previous section that the population growth rate in the two regions was similar and close to the US average, and having established that the two regions were equally restrictive on housing construction, it follows that the sorting of immigration streams along educational attainment lines was predominantly driven by distinct demand for labor in the two regions, which attracted higher-educated people to the Bay Area and less-educated people to Southern California. The question of immigration is explored next.

IMMIGRATION & ETHNIC COMPOSITION

Neither initial population size nor housing costs can explain the extraordinary income growth of the Bay Area or the relatively slower income growth of Southern California. The analysis of differences in shares of educational attainment showed that initial differences in educational attainment were consistent with the relatively higher per capita income in the Bay Area, and that over the 1980 to 2010 period the Bay Area increased its share of higher educational attainment categories tremendously, consistent with an even more extraordinary

income growth. Southern California on the other hand saw its share of the lowest educational category increase with relation to the Bay Area's.

In light of the fact that the Bay Area added about 2 Million people to the region over the period and that Southern California added about 6 Million people, it is plausible that aggregate regional educational attainment differences over time were driven by the level of education of distinct immigration streams. This section investigates the role of immigration on the income trajectories of the Bay Area and Southern California since 1980.

First let us compare the ethnic composition of the two regions in each of the four 1980 to 2010 decades. Table 6 below shows that between 1980 and 2010, the share of Hispanics and Asians approximately doubled between 1980 and 2010[8], and the share of Whites approximately halved in both regions. This both regions experienced a tremendous number of in-migration over the past three decades. The share of Hispanics in Southern California increased from 24% in 1980 to 44% in 2010, and in the Bay Area it increased from 13% to 22% over the same period. The share of Asians (Asian and Pacific Islanders – API) in the Bay Area increased from 9% in 1980 to 22% in 2010, and in Southern California the share of Asians increased from 6% to 12%.

[8] Recall all 2010 data is calculated as the 2005 to 2009 average.

Table 6: *Racial composition of total population, 1980, 1990, 2000 and 2010.*

	White	Hispanic	Asian	Black
Los Angeles, 1980	61%	24%	6%	9%
San Francisco, 1980	69%	13%	9%	9%
Los Angeles, 1990	50%	32%	9%	8%
San Francisco, 1990	61%	15%	14%	8%
Los Angeles, 2000	39%	40%	11%	7%
San Francisco, 2000	51%	20%	19%	7%
Los Angeles, 2010	35%	44%	12%	7%
San Francisco, 2010	46%	22%	22%	7%

Source: Author's calculations using BRR data.

The data thus confirm the widely-recognized sorting of immigrants across the two regions, with Hispanics predominantly choosing LA as a destination over the Bay Area. Moreover, by 2010 the share of Asians in the Bay Area is almost double that in LA. In fact table 7 below shows that both regions have had a comparable share of immigrant workers active in their labor forces over the past three decades, confirming that they differed not in the extent of in-migration but rather the ethnic composition of immigration streams; the Bay Area attracted, in relative terms, more Asians and Soutehrn California attracted more Hispanics.

Table 7: *Proportion of Immigrants among Workers Active in the Labor Market*

	1980	1990	2000	2005-10
Los Angeles	20%	32%	40%	38%
San Francisco	16%	28%	37%	39%

Source: Tom Kemeny's calculations using IPUMS data (Storper et al, Forthcoming).

Immigrants in the Bay Area earned over 20% more than immigrants in Southern California back in 1980, and the immigrant wage premium had grown to 30% by 2010 (see

table 8 below). From a neo-classical- economics perspective, this wage difference should have been bid down by LA immigrants moving to live in the Bay Area. As we saw above, the real wage premium is even larger than the nominal one. One plausible explanation is that the jobs available in the Bay Area require a level of skill/education not attained by LA immigrants.

Table 8: *Wages among Hispanic Immigrant Workers*

	1980	**1990**	**2000**	**2005-10**
Los Angeles	9,005	14,461	20,214	27,037
San Francisco	11,102	17,516	24,450	35,230
SF Wage Premium	**23%**	**21%**	**21%**	**30%**

Source: Tom Kemeny's calculations using IPUMS data (Storper et al, Forthcoming).

A more in-depth comparison of immigrant workers' wages by educational attainment (Table 9 below) shows that Bay Area immigrants increasingly earned higher wages than Southern Californian immigrants within the same educational-attainment categories. Back in 1980 immigrants across all educational attainment categories were similar across the board. Over the next 30 years however, immigrant college graduates in the Bay Area earned almost $30,000 more than equally educated immigrants in Southern California. The immigrant education wage premium extends to those with some college education (about $6,000 more in the Bay Area). In addition to distinct industrial demand structures sorting immigration streams by educational attainment, even within high-educational attainment categories the Bay Area's industrial structure is utilizing highly educated human capital much more productively and increasingly so over time; back in 1980 immigrant college graduates earned a little more in Southern California.

Table 9: *Wages for Immigrant Workers by Educational Attainment*

	1980	1990	2000	2005-10
Los Angeles – College Graduates	$17,981	$33,929	$45,902	$62,637
San Francisco– College Graduates	17,773	37,740	65,398	91,034
Los Angeles – Some College	12,441	21,787	27,909	36,568
San Francisco– Some College	12,807	23,128	33,832	42,925
Los Angeles – HS Graduates	10,904	16,396	21,695	27,840
San Francisco– HS Graduates	11,351	17,843	25,038	30,750
Los Angeles – Some HS	8,251	12,730	17,575	21,793
San Francisco– Some HS	10,098	14,541	19,489	23,489

Notes: Tom Kemeny's calculations using IPUMS data. College graduates are defined as workers with at least 4 years of college (Storper et al, Forthcoming).

The above evidence points to a demand-driven sorting of immigration streams along educational attainment categories, and in addition the Bay Area utilizes its more educated workforce, immigrant and native, more productively. The evidence thus points to an increasingly innovative industrial structure as the source of demand for higher educated workers, which in turn generated the Bay Area's extraordinary 1980 to 2010 income growth. We now turn to exploring the evolution of industrial composition as the plausible source of this change in demand for human capital and its productivity differences across the two regional economies.

INDUSTRIAL COMPOSITION

The evidence in the preceding sections points to the evolution of LA and the Bay Area's industrial structures as the most plausible explanation for the divergence, one which cannot be sufficiently attributed to initial 1980 population, housings costs throughout the period, educational attainment (whose changes over time were shown to be most likely

demand-driven rather than a 'cause' of industrial change – evident amongst other things by Bay Area workers earning increasingly more over time within the same educational categories), or ethnic composition and immigration streams (for which the same demand-driven arguments apply). How did the two regions' industrial structures evolve over the past three decades, and moreover, how did they differ back in 1980? Might initial differences back in 1980 explain the subsequent changes in specialization?

In order to simplify the analysis and maximize the relevance of the analysis, the two regions are compared across their tradable industries. Tradable and non-tradable industries are defined by the potentially feasible scope of their markets; a hair-salon for example is part of a non-tradable industry because with the exception of tourists (who make up a tiny fraction of the entire industry's revenues) its potential feasible scope is restricted to people living in the region (one day if a hair-dresser is able to manipulate a robot to cut a customer's hair using remote holographic technology, it might well become a tradable industry; just as bus-drivers might have the technology to drive buses remotely in the future). The apparel industry on the other hand need not be restricted to local sales only, but rather can sell its products anywhere in the world by exporting them. Application developers for mobile devices can sell their products online anywhere in the world (regulation permitting), thus also part of the tradable industries. As the global market is so large and continues to offer expansion frontiers for tradable industries, and given the limited and fairly static size of markets for locally-serving firms such as a restaurant, regional growth is predominantly driven by the tradable sector, which will thus be the focus of this comparative analysis (consistent with export base theory which can be traced at least as far back as North (1955) and Kaldor (1970)).

Back in 1980 the employment share of IT workers in the Bay Area and Southern California was almost identical at 2.6%, which in light of LA's relative size meant that the

region had twice as many IT employees, just below 82,000 workers in the IT industry, compared to below 39,000 in the Bay Area's (see table 10 below). By 2010 however, the Bay Area's share of IT employment rose to over 10%, and overtook LA in absolute numbers as well as shares, with over 255,000 IT workers compared to just over 150,000 in LA. ***Table 10:*** *Tradable Agglomerations in 1970 and 2010*

	Los Angeles -1970		San Francisco- 1970	
Tradable Agglomeration	Employees	Employment Share	Employees	Employment Share
Information Technology	81,872	2.6%	38,621	2.7%
Aerospace and Defense	108,083	3.4%	455	0.03%
Logistics	39,851	1.3%	21.313	1.5%
Entertainment	22,978	0.7%	2,171	0.15%
Apparel	56,965	1.8%	7,806	0.06%
	Los Angeles -2010		San Francisco- 2010	
	Employees	Employment Share	Employees	Emp. Share
Information Technology	153,524	2.7%	255,334	10.2%
Aerospace and Defense	47,960	0.9%	735	0.02%
Logistics	129.651	2.3%	23,505	0.9%
Entertainment	141,025	2.5%	14,686	0.5%
Apparel	50,788	0.9%	819	0.03%

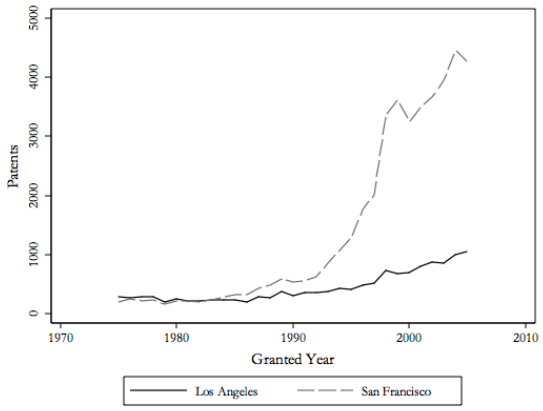
Source: Calculations by Tom Kemeny based on collections of 4-digit SIC codes (1970) and 6-digit NAICS codes (2010) using County Business Patterns. (Storper, Forthcoming)

One possible explanation for the Bay Area's growth in IT is that it was more innovative than LA's back in 1980, despite being half its size. Figure 1 below plots the number of patents registered by inventors in two IT industries, 'Computers and Communications', and 'Electrical and Electronic' in LA and the Bay Area since 1980. The data shows that the two regions had a similar number of patents in both industries between 1980 and 1990, but that

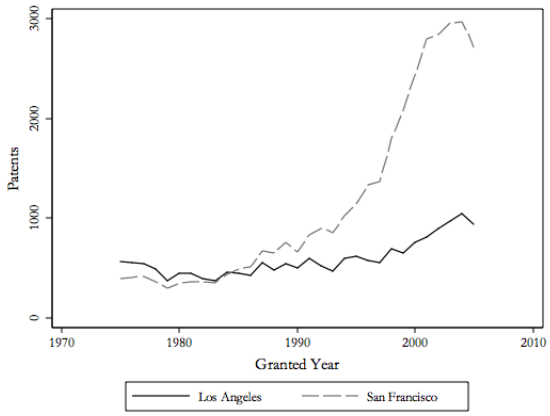
post-1990 the Bay Area patents in these two categories takes off, and by the mid-2000s it has more than double the number of patents in these two industries.

Figure 1: *USPTO Utility Patents Granted by Region, 1975-2005*

Computers and Communications



Electrical and Electronic



Source: Calculations by Tom Kemeny based on NBER patent data, as cleaned and organized in Sonn and Storper, 2008 (Storper et al, Forthcoming).

The evolution of the Bay Area's industrial structure is clearly captured in the above table 10: Between 1980 and 2010 the Bay Area became highly specialized in the IT industry. The story of Southern California's industrial structure over the period is less straight-forward, albeit equally consistent with widely-known stylized facts about its experience over the period. Aerospace and Defense back in 1980 accounted for 3.4% of regional employment, equivalent to over one hundred thousand employees. By 2010 that number had halved, which of course masks the decline from a much higher peak. The rise of the logistics industry which as will become apparent in a subsequent chapter comes to captures the attention of the regions' political and corporate leadership at the expense of other 'worlds of production', grows from just below 40,000 employees in 1980 (1.3% of regional employment) to just below 130,000 employees in 2010 (2.3% share of employment). The share of the logistics

industry in 2010 is equal to that of the Entertainment industry, which grew from an even lower employment share than logistics since 1980 when it accounted for a mere 0.7% of total employment (about 23,000 employees). Finally the relative decline and absolute stand-still of the Apparel industry captures the story of Manufacturing decline in the region, albeit again masking the decline since its peak in the 1980s.

The evolution of these two regions' specialization patterns is consistent with the evolution of their wages; the Bay Area specializes in a high-skilled high-waged industry, whereas Southern California loses its specialization in Aerospace (a high-wage high-skilled industry),increases specialization in the relatively lower-waged lower-skilled Logistics industry, increases its specialization in Entertainment albeit not sufficiently to maintain the region's relatively high per capita income, and it fails to build on its initially high share and absolute number of employees in the IT industry. As a result, LA's per capita income fails to keep pace with both the Bay Area and other major metropolitan regions' incomes in the United States.

The wage impact of these two regions' changing specialization patterns is evident from the average wages within their top-10 tradable industries by employment share (see table 11 below); the average 2010 wages in SF are much higher than in LA. A careful comparison of wages across identical industrial categories is equally revealing however. The story of the Bay Area's extraordinary income growth is more than a question of specialization at the 6-Digit level of industrial classification; the Bay Area's employees within the same industrial categories earn higher incomes. Consider 'Computer Systems Design Services', and 'Custom Computer Programming Services' for instance: Bay Area workers within these sectors enjoy higher wages than their Southern. The Bay Area's wage premium in IT is staggering, with workers in SF earning on average $20,000 more than their LA counterparts.

Not only is the Bay Area more specialized in IT, but those specific IT industries generate 20% more wages for their employees than the equivalent industries in LA.

Table 11: *Average Wages in Ten Tradable Sectors with Highest Employment, 2010*

Los Angeles		San Francisco	
Industry	Wages	Industry	Wages
Motion picture and video production	$69,016	Software publishers	$169,432
Hotels and Motels	*26,217*	*Custom computer programming services*	*111,648*
General warehousing and storage	40,878	*Electronic parts & equipment wholesalers*	*139,661*
Computer systems design services	*90,874*	*Computer system design services*	*111,312*
Women's clothing wholesalers	50,931	*Hotels and Motels*	*30,260*
Custom computer programming services	*89,295*	R&D in phys, eng, and life sciences (not bio)	133,834
Freight transportation arrangement	50,684	Computer and peripheral wholesalers	155,961
Women's, girls', and infants' cut & sew apparel	18,548	Data processing, hosting, and related services	120,464
Other aircraft parts and aux. equipment	65,685	Semiconductor and related device manuf.	131,059
Electronic parts & equipment wholesalers	*77,947*	Wineries	54,954

Note: Calculations by Dr. Tom Kemeny based on data from County Business Patterns. Sectors featured in both regions in italics. Wages are in nominal 2010 dollars.

One plausible explanation for such large within-industry wage premiums in favor of Bay Area workers is that the 6-Digit NAICS industrial classification masks differences in functions (quality ladders) or activities (i.e. these industries differ at a more disaggregated

levels of classification). Either way, in light of the staggering wage differences and the stark patenting divergence in the 1990s within the two abovementioned IT industries, it is logical to conclude that even within these industries the Bay Area's firms are more productive, innovative and thus pay significantly higher wages. This of course is consistent with the hypothesized role of the region's transposition-enabling socio-relational context which enabled people, firms and institutions in the Bay Area to absorb, develop and commercialize new knowledge and ideas to a greater extent than in Southern California.

These findings substantiate the premise behind the case-selection of the comparative research that follows, that the Bay Area's extraordinary income growth between 1980 and 2010 was enabled by its socio-relational context, and moreover that an equivalent transposition-enabling context (as defined above) was absent in Southern California. This argument is further substantiated using regression analyses in the proceeding section.

CHAPTER 3: REGRESSION ANALYSIS

The previous section assessed the relative explanatory power of the effects of initial population size, housing costs, educational attainment levels, ethnic composition and immigration and industrial composition (including patents as a proxy for innovation capacity) on the Bay Area's extraordinary income growth between 1980 and 2010. The theoretically-guided analyses found that the income growth of the two regions was primarily driven by the changes in the two regions' industrial composition/specialization and consequent demand for human capital. This in turn sorted immigration streams, impacted housing costs, changed the composition of human capital (educational attainment) and innovation capacities (patents per capita), with consequent impacts on the income growth over the period. This argument is

further tested in this section by conducting a regression analysis which controls for proxies of the regional characteristics discussed in the previous section.

The purpose behind this regression analysis is to show that even after controlling for (proxies of) the factors analyzed in the previous section the Bay Area's relative performance is above its predicted value. If its actual 1980 to 2010 income growth is substantially above its predicted value, then that would show that it out-performed regions with comparable (controlled-for) factors. This in other words would show that these factors, as argued above, cannot explain the extent of the Bay Area's 1980 to 2010 income growth. An average or below average relative performance (measured as the percentage difference between a region's predicted and actual income) is expected for Southern California, consistent with the premise for the case selection based on the evidence in the literature that a transposition-enabling socio-relational context was absent

Two models are conducted for this investigation. The first (Model 1) restricts the analysis to controlling for factor endowments back in 1980 only. The second (Model 2) adds changes over time. The models follow the following specification:

1980-2010 $\Delta Y = 1980Y + 1980Z + e$ (Model 1 and 2)

Whereby the growth in income over the period is regresses on the initial 1980 per capita income and a set of 1980 controls Z as follows:

1980Z = Log Population 1980 + Population growth 1980-2010 + Share of income on Rent + %BA> + %HS or less + %Hispanic 1980 + %Manufacturing + %FIRE + Patents/capita (Model 1).

And the following additional changes over time in Model 2:

Population Growth (1980-2010) + %Hispanic in 1990, 2000 & 2010.

The data used for this analysis is from the BRR database hosted by Manuel Pastor at the University of Southern California. The data is at the CBSA scale, therefore CBSAs were aggregated into CSA/CMSAs in order to conduct the analysis at the scale of the two metropolitan regions under investigation (see Appendix 1 for details and CBSA to CMSA concordance for the Bay Area and LA regions).

Population size is controlled using the log of population size in 1980 (and the population growth rate over the period in Model 2). The cost of housing is proxied by the average share of income on rent by the median household. This is admittedly a very rough approximation for true housing costs, but offers a sufficient approximation which was corroborated (for the Bay Area and Southern California regions) with a more precise calculation from micro-data, using both rental and owned properties (Storper et al, Forthcoming). Two variables, the share of the population with a BA degree or better and the share with a high-school education or less are used to proxy the level of education in 1980.

Immigration is proxied by the share of Hispanics in 1980, because arguments about the wage-dampening effects from immigration on the Southern California economy essentially refer to the share of Hispanics in the region (Chapple and Lester, 2010). Intra-decadal changes in the share of Hispanics (predominantly driven by immigration) are controlled in Model 2 by including the share of Hispanics in 1990, 2000 and 2010.

The industrial structure is proxied by the shares of employment in manufacturing and FIRE industries, and innovation capacity back in 1980 is proxied by the number of patents per capita. The share of employment in finance, insurance and real-estate (%FIRE) and in manufacturing (% Manufacturing) are very broad industrial classifications typically used in

the cross-regional income growth literature, especially over the 1980 to 2000 period (Glaeser and Shapiro, 2003; Pastor, 2009; Chapple and Lester, 2010). The former is a proxy for the share of employment in higher-skilled sectors that grew in employment and wages over the period in the US as a whole, and the broad manufacturing category is commonly used as a proxy for the regional exposure to the large segment of US manufacturing which saw a decline in wages and employment growth over the period due to a combination of skill-bias technological change, and competition to newly industrialized countries whose labor costs were much cheaper.

Such a broad level of industrial classification masks substantial differences in specialization across regional economies; some regions might be specialized in higher-end functions within the manufacturing sector, while others might be at the lower-end for example. As we saw above however, the industry responsible for driving the income growth of the Bay Area, IT, represented an equal share of employment in LA and the Bay Area's active workforce, and levels of patenting and occupational task context were also comparable. Initial differences in the share of IT employment cannot account for changes in LA and the Bay Area's industrial structure, and thus cannot explain the extraordinary income growth of the Bay Area. The aggregate level of classification was included to capture the general trend which is commonly used in the literature to distinguish between favourable and un-favourable broad industrial specialization (its inclusion is thus designed to gauge the negative impact of a general specialization in manufacturing and a favourable impact from a broad specialization in FIRE).

Patents per capita, the proxy used for innovativeness is also an imperfect one, albeit also commonly used in the literature. The imperfection of this measure is due to the uneven propensity to patent inventions across industries, and the uneven proportion of patented

inventions to be successfully exploited and commercialized. Nevertheless, this measure is widely used in the literature as a proxy for innovation capacity (Jaffe, Trajtenberg, and Henderson, 1993), and is expected to be positively correlated with income growth over the period.

Descriptive statistics of these variables for LA, the Bay Area and the average for 165 regions in the sample are presented in table 12 below. Both LA and the Bay Area's 1980 incomes are above the US average and above the 95th percentile of incomes, so is their 1980 population, their share of income on rent, their percentage BA or better, both regions' share of High School or less is lower than both the US mean and 5th percentile, both regions' percent Hispanics is above the US average and above the 95th percentile, so is their share of employment in FIRE industries, their number of patents per capita, and their percentage Hispanics over the period. The only variables that lie on either side of the US average are the percentage of employment in manufacturing which was equivalent to21% of employment in Southern California and 16% in the Bay Area, compared to a US average of 18%; and of course the level of per capita income growth, which was above the 95% confidence interval for the Bay Area and below in the Southern California. These descriptive statistics are in line with expectations.

Table 12: Descriptive statistics for LA, the Bay Area and the US average – for variables in Models 1 and 2.

Variables (Models 1 and 2)	LA	Bay Area	US Mean	Std. Err.	95% Conf. Interval	
PCInc Growth 1980-2010	2.29	3.078	2.60	0.03	2.55	2.66
Initial Income (1980)	8,360	9,312	7,086	72.92	6,942	7,230
Log Pop 1980	16.26	15.50	13.20	0.08	13.05	13.36
Share Income on Rent ('80)	26.52	25.14	24.51	0.16	24.19	24.84
%BA> (1980)	0.18	0.25	0.16	0.00	0.15	0.17
%HS< (1980)	0.59	0.52	0.68	0.01	0.67	0.69
%Hispanic	0.24	0.12	0.06	0.01	0.04	0.08
% Manufacturing	0.21	0.16	0.18	0.01	0.17	0.20
% FIRE	0.09	0.10	0.07	0.00	0.07	0.08
#Patents/Capita	35.64	48.05	23.74	1.30	21.18	26.30
Pop Growth 1980-2010	0.53	0.35	0.47	0.04	0.39	0.54
%Hispanic 1990	0.32	0.15	0.08	0.01	0.06	0.10
%Hispanic 2000	0.40	0.20	0.11	0.01	0.08	0.13
%Hispanic 2010	0.44	0.22	0.13	0.01	0.10	0.15

Source: Author's calculations using BRR data.

Models 1 and 2 will be used to compute the 'predicted'1980-2010 income growth of 165 US MSA/CMSAs. In order to corroborate the conclusion from the above analysis, that these controls cannot sufficiently explain the extraordinary performance of the Bay Area, the actual 1980-2010 income growth of the Bay Area is expected to be substantially higher than its predicted value. Moreover, in order to substantiate the absence of a transposition-enabling socio-relational context (to be further substantiated in subsequent analysis), here the relative performance of Southern California's income growth is expected to be average or close to average.

Regression analysis allows us to determine the relative income growth of regions (relative to regions with similar controls) by comparing the relative size of the residuals. The residual is the region's actual income minus the predicted value; and the predicted value can be interpreted as the average income growth of regions with similar control measures. If the residual of the Bay Area is relatively and substantially higher than the residual of all regions, then one can conclude that indeed the Bay Area's 1980 to 2010 income is indeed extraordinary, even when compared to comparable regions (rather than all regions). Furthermore, Southern California's income growth is expected to be in line with comparable regions. Both of these findings would substantiate the findings in part 1 above, and the premise behind subsequent research.

Regression results in table 13 below show that according to Model 1, the Bay Area's actual 1980-2010 income growth was 22% above its predicted value, which ranks it in the 98th percentile of outperforming regions (4th out of 165 regions with 2010 population greater than 200,000, and 1st out of 53 regions with population greater than 1 Million), and LA's actual income growth was 7% below, ranking in the 25th percentile (ranked 123rd out of 165 MSA/CMSAs). Results in Model 2 show that adding population growth and the share of Hispanics over the period make no significant difference to these results.

These results corroborate arguments presented in the above analysis that weighed in favor of the fact that major income growth-related characteristics back in 1980 cannot explain the extent of the Bay Area's extraordinary income growth over the period. Moreover, the results here also substantiate the argument that Southern California's income growth was average or even mediocre given the region's 1980 characteristics. These results also corroborate the premise of the two-case selection for an investigation about the origins and scope of the Bay Area's transposition-enabling socio-relational context, and the use of

Southern California as a 'placebo-like' case of a region that lacked such a socio-relational context.

Tale 13: *Regression results for models 1 and 2, and relative performance for LA and the Bay Area.*

	Model 1	**Model 2**
Number of Observations	165	165
R-Square	0.51	0.57
Adjusted R-Square	0.48	0.53
Initial Income (1980)	-.000278*	-.000248*
Log Pop 1980	.11589*	.13057*
Share Income on Rent (1980)	.017	.012
%BA> (1980)	6.65*	5.97*
%HS< (1980)	2.72*	2.24*
%Hispanic	-1.30*	-2.24
% Manufacturing	-.012	.15
% FIRE	6.97*	4.65*
#Patents/Capita	.0009	.0006
Pop Growth 1980-2010	-	.249*
%Hispanic 1990	-	4.86
%Hispanic 2000	-	-4.47
%Hispanic 2010	-	.66
Constant	-.74	-.48
Bay Area Relative Performance	22%	22%
Bay Area Relative Performance	**98th Percentile**	**98th Percentile**
LA Relative Performance	-7%	-7%
LA Relative Performance	**25th Percentile**	**22nd Percentile**

Source: Author's calculations using OLS regression. Figures with an asterisk denote

significance to the less than 1% level. The relative performance is the residual divided by the predicted (i.e. the percent by which the actual income was above or below the predicted income). The percentile is derived from the ranking out of the 165regions in the models.

The relative performance of all regions with 2010 population greater than 1 Million were ranked and presented in table 14 below. They show that the Bay Area was in a similar class of out-performers such as Washington, Boston, San Diego and New York, whereas LA relative performance is comparable to regions such as Pittsburgh, Portland, Phoenix and Atlanta (not quite as bad as Detroit at -11%, although not too far off either). Of these relatively large regions the Bay Area had by far the greatest relative performance, confirming is extraordinary income growth over the 1980 to 2010 period over and above regions with comparable controls. LA's performance was below average comparable regions, but not too far below its predicted value in percentage and absolute terms.

Table 14: *Relative performance of regions with 2010 population > 1Million.*

	Region (Pop>1M) – Model 1 Results	**Rel. Perf.**
1	**San Francisco-Oakland-San Jose, CA (C)**	**0.22**
2	Providence-Fall River-Warwick, RI-MA	0.18
3	Hartford, CT	0.14
4	Charlotte-Gastonia-Rock Hill, NC-SC	0.14
5	Washington-Baltimore, DC-MD-VA-WV (C)	0.13
6	Boston-Worcester-Lawrence, MA-NH-ME-CT (C)	0.13
7	San Diego, CA	0.13
8	San Antonio, TX	0.12
9	New London-Norwich, CT-RI	0.11
10	New York, Northern New Jersey, Long Island, NY-NJ-CT-PA (C)	0.08
11	Norfolk-Virginia Beach-Newport News, VA-	0.08
12	Seattle-Tacoma-Bremerton, WA (C)	0.07

13	Raleigh-Durham-Chapel Hill, NC	0.06
14	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD (C)	0.05
15	Birmingham, AL	0.05
16	Minneapolis-St. Paul, MN-WI	0.04
17	Sacramento-Yolo, CA (C)	0.04
18	Jacksonville, FL	0.03
19	Richmond-Petersburg, VA	0.02
20	Denver-Boulder-Greeley, CO (C)	0.01
21	Chicago-Gary-Kenosha, IL-IN-WI (C)	0.00
22	Buffalo-Niagara Falls, NY	-0.01
23	Austin-San Marcos, TX	-0.01
24	Nashville, TN	-0.01
25	Milwaukee-Racine, WI (C)	-0.02
26	Tampa-St. Petersburg-Clearwater, FL	-0.02
27	Louisville, KY-IN	-0.02
28	Memphis, TN-AR-MS	-0.02
29	St. Louis, MO-IL	-0.03
30	Greensboro--Winston Salem--High Point, NC	-0.03
31	Kansas City, MO-KS	-0.04
32	Grand Rapids-Muskegon-Holland, MI	-0.04
33	Greenville-Spartanburg-Anderson, SC	-0.04
34	Cincinnati-Hamilton, OH-KY-IN (C)	-0.04
35	Indianapolis, IN	-0.04
36	Salt Lake City-Ogden, UT	-0.05
37	Pittsburgh, PA	-0.05
38	Portland-Salem, OR-WA (C)	-0.06
39	Las Vegas, NV-AZ	-0.06
40	Orlando, FL	-0.07
41	Columbus, OH	-0.07
42	New Orleans, LA	-0.07
43	**Los Angeles-Riverside-Orange County, CA (C)**	**-0.07**

44	Atlanta, GA	-0.08
45	Phoenix-Mesa, AZ	-0.08
46	Cleveland-Akron, OH (C)	-0.11
47	Detroit-Ann Arbor-Flint, MI (C)	-0.11
48	Dallas-Fort Worth, TX (C)	-0.11
49	Rochester, NY	-0.11
50	Miami-Fort Lauderdale, FL (C)	-0.12
51	Fresno, CA	-0.12
52	Oklahoma City, OK	-0.14
53	Houston-Galveston-Brazoria, TX (C)	-0.14

Source: Author's calculations from regression analysis using BRR data.

SUMMARY - PART I

The analysis in this chapter has attempted to understand what major income growth-related characteristics might explain the Bay Area's extraordinary income growth over the 1980 to 2010 period, and the LA-SF income divergence. Guided by theories from Regional Science/Urban Economics and Economic geography, a few key factors were analyzed in detail. The analysis showed that neither region had an advantage from its initial population size, as they were both beyond the minimum threshold for localization and agglomeration economies. Housings costs were shown not to diminish the relative income differences between the two regions, and both regions were shown to be equally restrictive on land-use. Housing costs were thus shown to be unlikely drivers of immigration streams across the two regions. The increase over time in the share of higher education attainment in the Bay Area coincided with a tremendous increase in the education premium.

An analysis of the changing industrial structure in the two regions showed that the Bay Area specialized in IT which is a highly-innovative and high-aged industry. Moreover

even across the IT industry, the Bay Area workers gained substantially higher incomes and were more innovative post01990, evident by patent data. In fact data showed that immigrants within educational attainment categories earned more in the Bay Area; therefore the evidence points to the sorting of immigration streams by the changing demand for human capital of the two regional industrial structures. The most likely cause of the Bay Area's increasingly innovative and high-waged industrial specialization over the 1980 to 2010 period is its widely-recognized transposition enabling socio-relational context. Southern California's industrial composition on the other hand shifted from high-waged aerospace to relatively lower-waged logistics, while growing Entertainment albeit insufficiently to maintain the region's relatively high per capita incomes relative to the Bay Area and US regions as a whole.

The analysis in the first section did however highlight two small initial differences which although seemed too small to explain the extent of the Bay Area's income growth and specialization in IT, might have been sufficient initial advantages; these were initial educational attainment and patents per capita. These and proxies for the other variables discussed in the first section were further tested using regression analysis techniques. Results confirmed that the Bay Area's extraordinary income growth over the period relative to US regions as a whole were equally extraordinary even with relation to comparable regions back in 1980.

The analysis thus supports the premise behind the case selection, that the Bay Area's widely-recognized socio-relational context plausibly played an important role in its extraordinary income growth over the past several decades. Results also show that Southern California's income growth over the period was somewhat below average, thus also supporting the premise, as per the literature discussion at the beginning of Part I, that the

Southland lacked a transposition-enabling institutional context. The research that follows will investigate the *scope* (in Part II) and historical *origins* (in Part III) of the Bay Area's transposition-enabling socio-relational context, and results will be substantiated by contrast with Southern California.

PART II – SCOPE

"If I've learned anything in the last seven years, it's that ideas live less in the minds of individuals than in the interaction of communities"
(Fred Turner, 2006-p.VII)

The objective of the research studies in this Part II of the dissertation is to explore the *scope* of the Bay Area's transposition-enabling socio-relational context between 1980 and 2010 – the divergence period[9], compared with its hypothesized absence in Southern California (proposition 1). Recall the definition of a transposition-enabling socio-relational context for the purpose of this study is characterized by the following two features:

1) Cross-realm relations (possibly enabled by brokers or anchor tenants), and
2) Widely shared perceptions and belief systems.

To test the above hypothesis (Proposition 1) and to gauge the scope of the socio-relational context of the Bay Area, the studies in this part of the overall research are structured into two studies: The first explores the degree to which the corporate leadership structure is interlinked, both overall (across corporations) as well as across industrial and

[9] Although evidence of the Bay Area's transposition-enabling socio-relational context dates back to the genesis of the IT industry in the first half of the 20th Century, its industrial and economic effects are most apparent during the 1980 to 2010 period. It is precisely for this reason that its scope is explored during this period when it is most likely to be evident (i.e. if a transposition-enabling socio-relational context at broader scopes of analysis cannot be detected during this period, it is less likely they exist in any other period).

geographic boundaries (cross-realm relations); and the extent to which the corporate leadership in the two regions develop widely shared perceptions and belief systems about the tumultuous changes taking place in the global economic environment, and the role of their regional economies within it. Together these two studies capture the two dimensions of a transposition-enabling socio-relational context as defined above, namely the extent of cross-realm relations and possible role of brokers or anchor-tenants, and the extent of widely-shared perceptions and belief systems at the scope of the high-end corporate social structure.

The second study in this part of the research investigates whether findings at the corporate level are found across broader scope of society at large. The degree of shared belief systems and cross-realm relations at the societal level are proxied using widely-used social capital measures of generalized trust and the size of the civic sphere.

CHAPTER 4: THE HIGH-END CORPORATE SOCIAL STRUCTURE

THE RELATIONAL STRUCTURE

Measuring the extent of cross-realm relations across a region's corporate structure poses a methodological challenge of immense proportions, not only because of the sheer number of people and corporations involved, but also because many different types of relations can exist between them. The purpose behind this investigation is to determine the extent to which people in different industries and cities know each other, or 'talk', as such social relations are key to the re-combinatory process akin to high-end entrepreneurship and industrial genesis; if actors from different realms have few social relations with actors from different realms and seldom meet each other, they are less likely to exchange novel and context-specific information and make introductions that can result in 'exploiting' structural

holes in pursuit of knowledge creation and commercialization opportunities, and consequently transposition.

Board interlocks were selected as the most wide-spread and feasibly measurable cross-realm relation across the corporate sector, which in light of the latest directorate research have been shown to be primarily driven by social relations - who knows whom (Davis, 1996). Their scope of potential cross-realm connections are certainly broader than those which are driven by industry-specific considerations such as joint-ventures and joint-research relations. Social relations are thus arguably the most wide-spread type of relation between actors in diverse industrial realms, and would thus act as an appropriate proxy for cross-realm relations across the corporate structure.

A broad literature dating back to the 1970s on corporate board interlocks has shown that corporations often share directors with other corporations and the larger the firm the more likely it is to interlock with other firms (Mizruchi, 1996). The nature of corporate interlocks has changed a great deal over the course of the 20th Century. Research on the US corporate structure conducted in the 1970s and early 1980s highlight collusion or co-optation (Pfeffer and Salancik, 1978), bank control over corporate decision-making (Kotz, 1978), bank access to corporate and industry information (Mintz and Schwartz, 1985) and corporate elite cohesion and political power (Useem, 1984) as conscious or inadvertent outcomes of corporate board interlocks. More recent empirical research has found a clear relationship between board interlocks and "almost every important aspect of corporate governance, from executive compensation to strategies for takeovers and defending against takeovers" (Davis, 1996-p.1; Palmer, Jennings, and Zhou,1993; Haunschild, 1994; Davis, 1991; O'Reilly, Main, and Crystal, 1988). Davis thus conceives of interlocked boards as "a social institution" (Davis, 1996-p.1). Davis explains the effects of interlocks as "'mundane but consequential':

through their experiences on other boards, interlocking directors provide a conduit for social influences that create an informational and normative context - an "embeddedness" - for board decisions (Granovetter, 1985) (Davis, 1996-p.1); consistent with the conclusions of Mintz and Schwartz whim in their seminal research on board interlocks conclude that:

> "[t]he most compelling interpretation of the overall network created by the collection of individual reasons for and responses to director recruitment is a general communication system" (Mintz and Schwartz, 1985:141).

Research since the 1990s shows that directors are predominantly selected through personal/social ties (Davis, 1993) just as firms typically find employees through the social contacts of existing employees. Corporate board interlocks in the United States have thus come to "reflect the embeddedness of corporate governance in social structures (e.g. friendship or other ties)" (Davis, 1996-p. 1). Corporate interlocks thus offer the type of cross-realm relation suitable for this research, as the overall structure of interlocked organizations reflects the scope of social relations across the corporate landscape.

Research has also found a positive association between firm size and the number of interlocks (Dooley, 1969; Allen, 1974; Levine, 1977). The literature attributes this finding to the fact that size is indicative of power and the most powerful firms have more interlocks; that directors of the largest firms interact socially and thus appoint each other as directors; and for the prestige directors of large firms bring to host firms (Mizruchi and Stearns, 1988). Therefore in order to avoid sample bias from selecting organizations that are more or less likely to interlock due to their size difference, and due to the need to limit the sample size for pragmatic considerations (network analysis is very labor-intensive) the largest 60 to 70

organizations were selected to measure the degree of interlocks across corporations (thus essentially controlling for the size-effect on propensity to interlock).

CORPORATE BOARD INTERLCOKS

As discussed above, the largest corporations are more likely to interlock with each other than smaller firms. Therefore, in order to gauge the structure of social relations across the corporate landscape, the largest 60 to 70 firms by total were selected in each region in 1980, 1995 and 2010 revenues (see Appendix 2 for details of sampling method, database construction and total number and total revenues of sampled firms in each cross section).

The scope of this research complements previous studies on the Bay Area's socio-relational context (such as university-industry relations, and the brokered cross-realm relations in biotechnology and entrepreneurship) by focusing exclusively on the social relations across the highest echelons of the corporate world. In this sense this research is contributing a glimpse into a hitherto unexplored and broader scope of the Bay Area's socio-relational context as a complementary perspective to those explored in the literature. No research known to this author however focuses exclusively on the socio-relational structure of the largest corporations in the region, whose innovativeness and symbiosis with the experimental-entrepreneurial world has been identified as a critical aspect of the region's industrial development, innovation and entrepreneurship (Kenney, 2000; Kenney and Von Burg, 2001; Saxenian, 1996).

In total 386 corporations with a total of 4,130 board members are analyzed; an average of 64 corporations and 688 board members per region for each of the three cross-sections (1980, 1995 and 2010). The average number of board members per firm was 11,

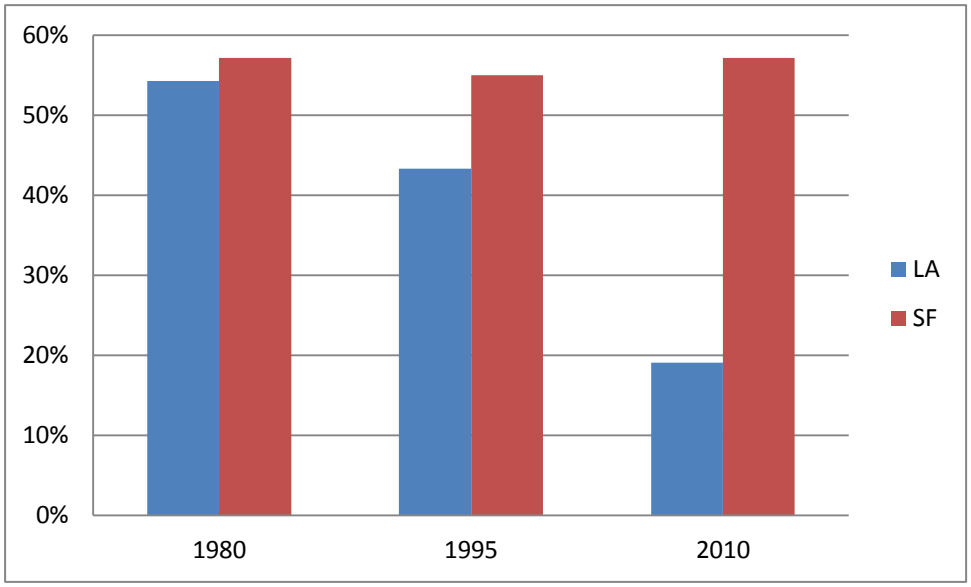
consistent with findings in the broader directorate interlock literature (Hallock for example found an average of 12.7 directors from a large sample of US corporations – Hallock, 1997).

Some definitions and vocabulary are necessary in order to understand network analysis in a technical sense. The basic terms in network analysis are "nodes", "relations" and "components." A "node" is the entity whose relations are being analyzed. In this study therefore the nodes are corporations, and in subsequent analysis links between industries and cities are analyzed, in which case nodes become industrial categories and cities. In this analysis "relations", "connections", "ties" or "links", terms use interchangeably, signify a board interlock. Links between industries therefore occur when a director on the board of a company in one industry also sits on the board of another company in a different industry. A component in a network is composed of directly and indirectly connected nodes. If organization A shares a board member with organization B, and organization B shares a board member with organization C, then organizations A, B and C are part of the same component as they are all directly or indirectly related or linked to one another. The largest component in a network is therefore the component with the greatest number of nodes. The maximum number of nodes in a component is equal to the number of nodes in the overall network. The software used for network analysis was UCINET (Borgatti et al., 2002).

The corporate board networks in the two regions were very similar back in 1980, and were both highly connected with around 60% of firms connected to at least one other firm, and around 55% of firms connected to each other in a single component in both regions. By 2010 the Bay Area corporate network had maintained its high number of board interlocks, with 78% of firms connected to at least one other firm and 57% of firms connected to each other in its largest component. In Southern California on the other hand, the corporate network had fragmented significantly over the period, with 41% of firms connected to at least

one other firm, and more tellingly, only 19% connected to each other in the largest component. Figure 2 presents the percentage of firms in the largest component in 1980, 1995 and 2010 in the two regions. There was a large decline in the size of Southern California's largest component between 1995 and 2010.

Figure 2: *Percentage of sampled firms in largest component, by year, LA Vs SF.*



Source: Author's calculation, number of interlocked firms in each network's largest component as a percentage of all firms in the sample.

Figures 3a to 3f are graphic representations of the two regions' sampled business networks in 1980, 1995 and 2010. As you can see in Figures 3a and 3b, the LA and Bay Area networks are very similar, with 38 firms in LA's largest component, and 42 in the Bay Area's. The two regions' most connected firms are their largest banks and utility companies: Security Pacific Corp and Southern California Edison in Southern California; and Wells Fargo and Pacific Gas and Electric in the Bay Area, each connected to about 11 other firms. Figures 3c and 3d illustrate the corporate networks fifteen years later, in 1995. The number of firms declined in both regions, albeit more so in Southern California, with just 27 firms in its largest component compared to 33 in the Bay Area. The clear difference however between

the two regions' 1995 networks is the number of connections of the most connected firms. Whereas back in 1980 both regions' two most connected firms had about 11 connections each, by 1995 the most connected firms in Southern California were Wells Fargo and Scecorp with 8 connections each (Wells Fargo had re-located its headquarters to Los Angeles, albeit temporarily), compared to the Bay Area where in 1995 APL Limited and American President were connected to 11 other firms each, and Transameric Corp's 9 connections. Another 15 years later, and as illustrated in Figures 3e and 3f, the LA network fragments substantially, with a mere 12 firms in the largest component, compared to 36 in the Bay Area's largest component. Avery Denison in Southern California is the most connected firm in the region's sample, connected to just 4 other firms, compared to Intuit in the Bay Area with connections to 7 other firms, and Intel and Cisco with connections to 6 other firms each.

This initial analysis points to the gradual fragmentation in LA's network of corporate elites between 1980 and 1995, and the accelerated fragmentation between 1995 and 2010. The Bay Area's corporate network however maintains its relatively high level of connectivity throughout the forty year period.

Figure 3a: *LA network of board interlocks, 1980.*

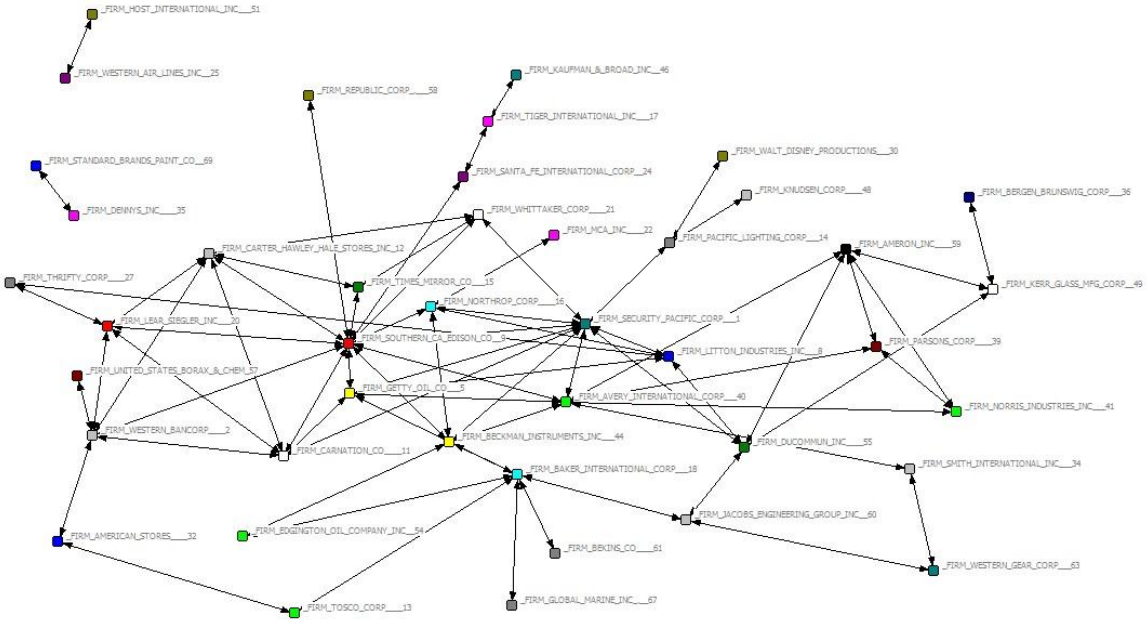


Figure 3b: *Bay Area network of board interlocks, 1980.*

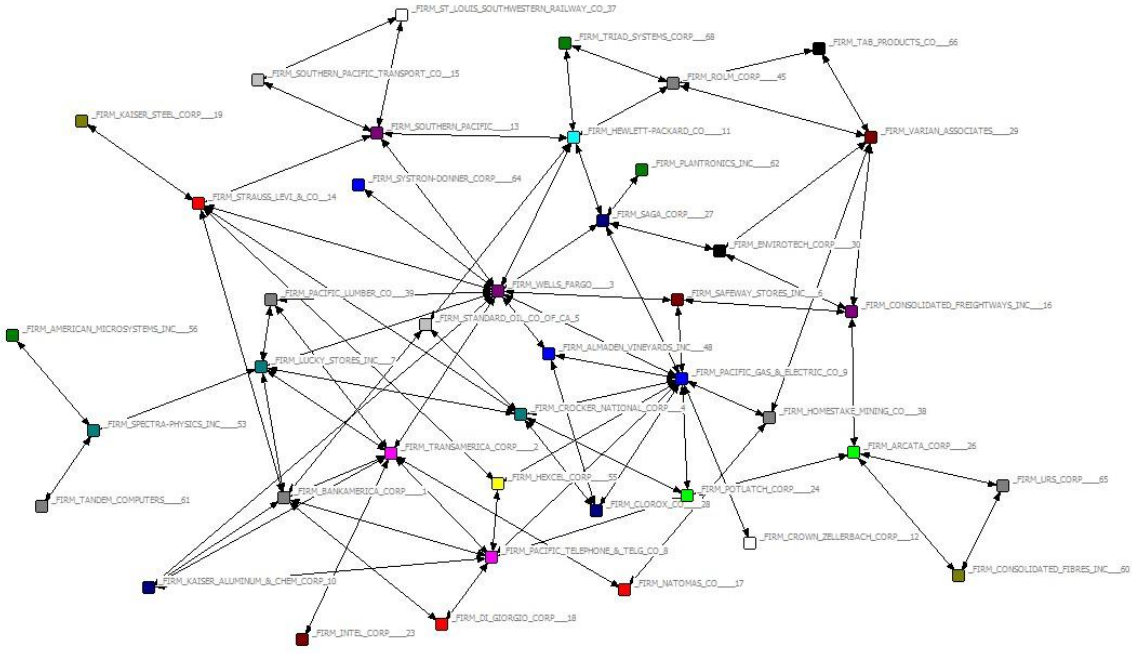


Figure 3c: *LA network of board interlocks, 1995.*

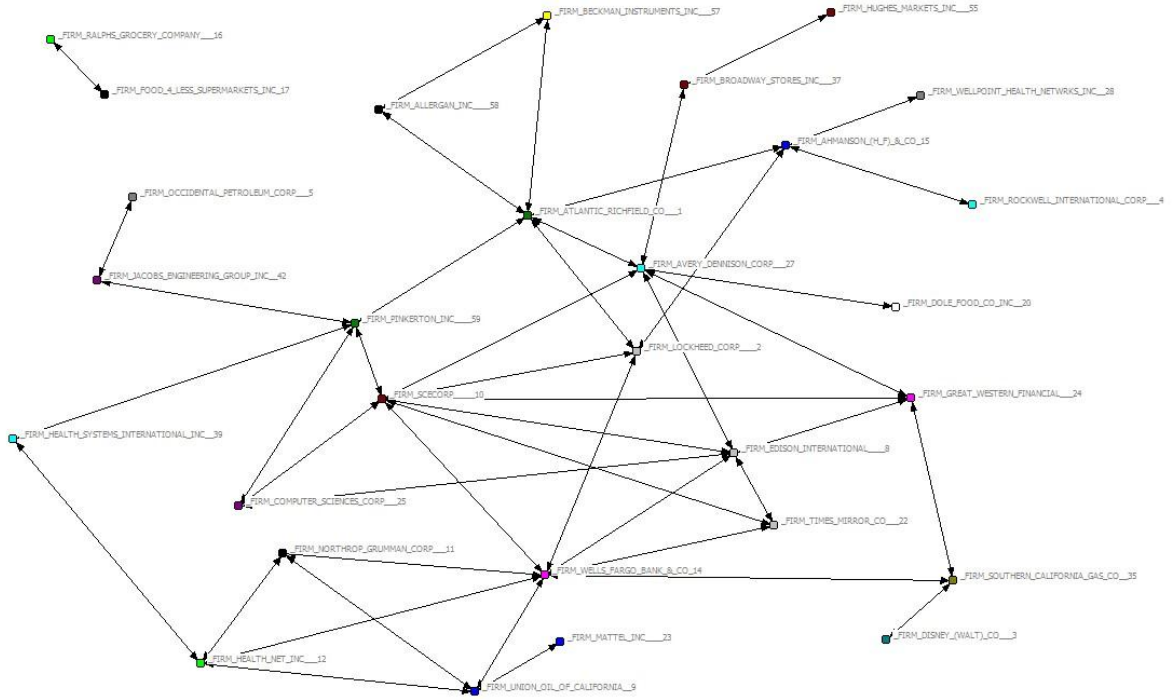


Figure 3d: *Bay Area network of board interlocks, 1995.*

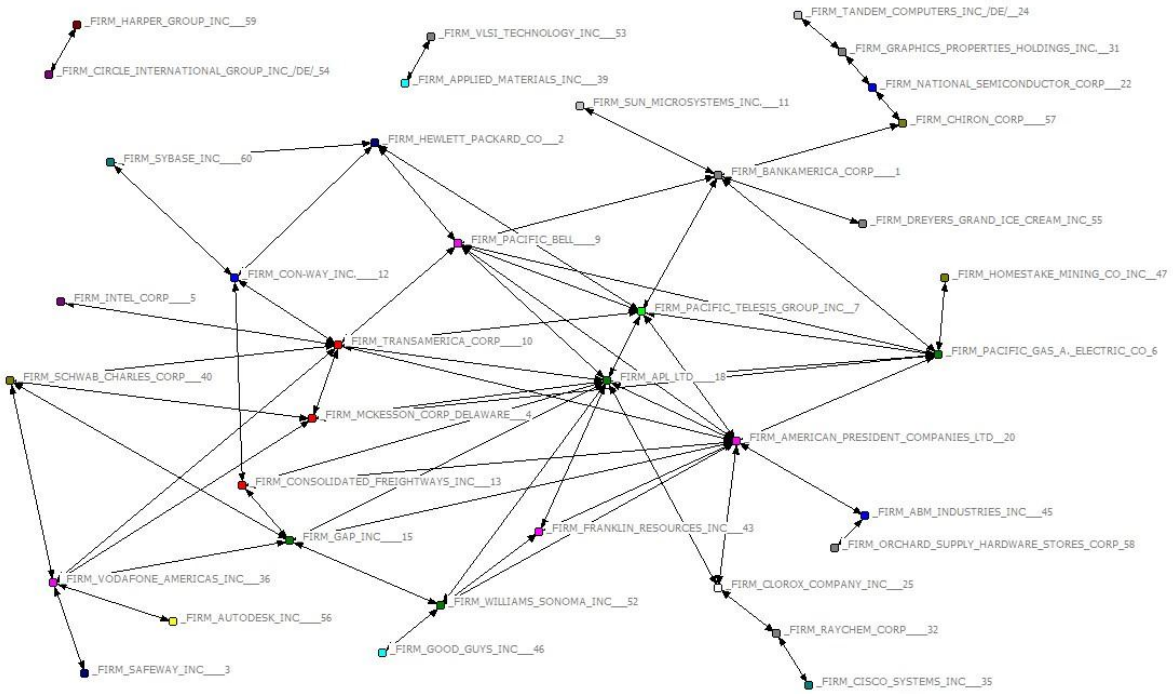


Figure 3e: *LA network of board interlocks, 2010.*

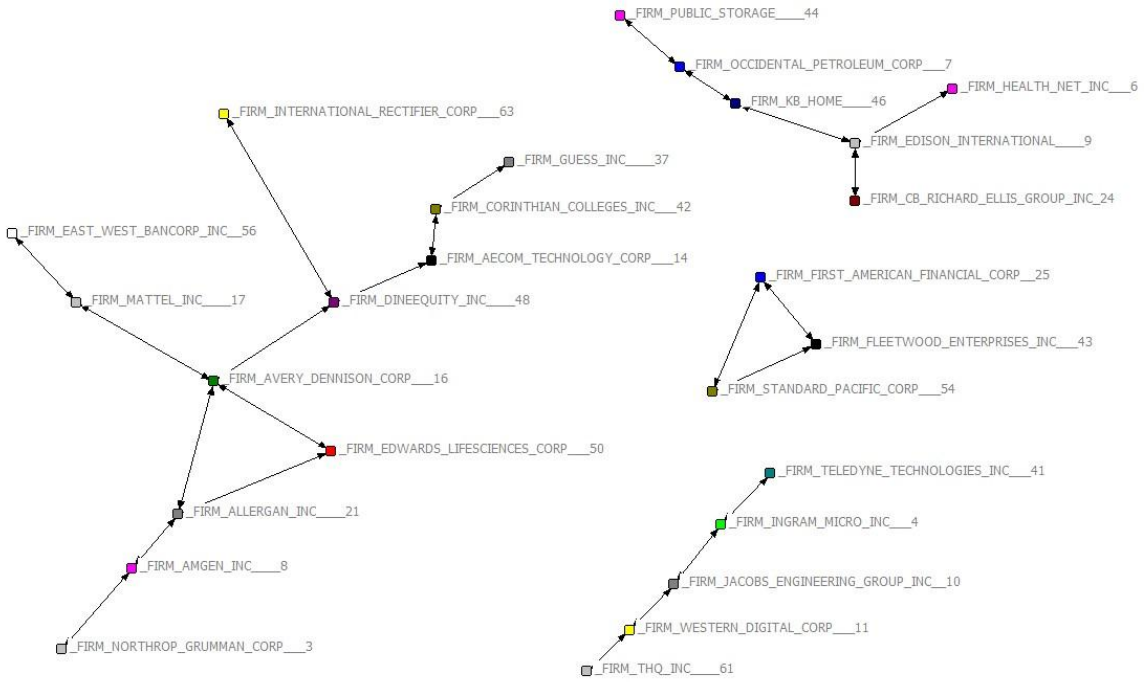
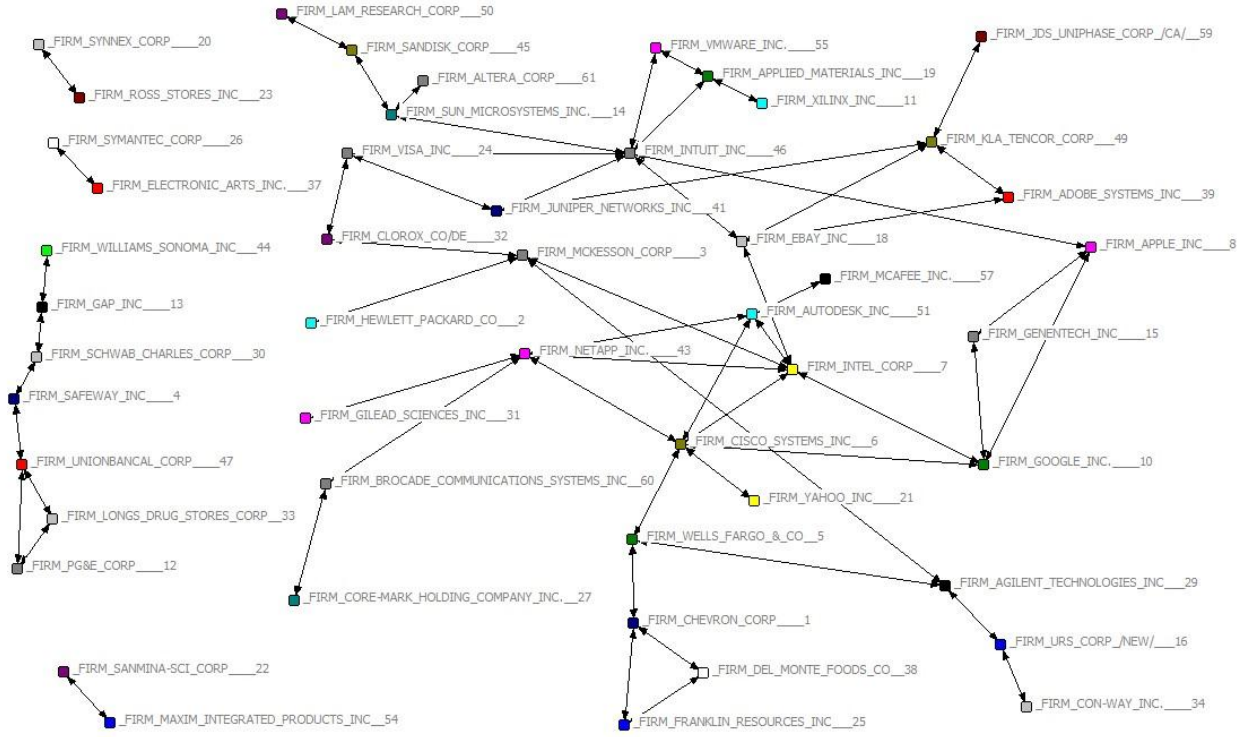


Figure 3f: *Bay Area network of board interlock, 2010*



Source: Author's calculations.

Thus, both regions had a similar level of board interlocks back in 1980, maintained in the Bay Area until 2010, but in Southern California the interlocks of the largest corporate boards fragmented by 1995, and continued to do so through 2010. This is a curious finding in light of the literature that highlights the resilience of the US corporate structure as a whole, which maintained its overall structure (albeit with reduced density and centrality) despite the receding of bank centrality, corporate re-structuring (mergers and acquisitions) and the emergence of new high-tech firms over the course of the 1980s and 1990s (Barnes and Ritter, 2001; Davis et al, 2003). The reasons for Southern California's fragmentation will be discussed in light of findings from other studies in this research, but note that the US corporate structure reflects non-spatial analysis of the overall corporate structure, and thus falls short of explaining how the changes in corporate structure play out across regions. If, as one would expect, the rise and fall of corporate connectivity is uneven across space, it is no surprise that the average US-wide finding coincides with some regions maintaining cross-firm relations while others do not. The contrasting evolution of LA and the Bay Area's corporate structures might be reflecting this uneven geographic dynamic which is masked by directorate research at the national level of corporate America.

CROSS-INDUSTRY BOARD INTERLOCKS

Despite the above findings it is conceivable that despite high connectivity in the Bay Area's corporate network as a whole, most relations are between firms in the same sectors, and thus does not constitute cross-realm (cross-industry in this case) relations, and that fewer interlocks overall in LA bridge a greater number of industries. To analyze the degree of cross-industry bridging in the two regions' corporate networks the extent to which corporate board interlocks connect firms in different industries is analyzed.

The greatest challenge in comparing the degree of cross-industry relations across two sampled corporate worlds is the difference in their sectoral composition. By sampling corporations based on their size, the difference in propensity to interlock is controlled for by equating the size of firms across the two samples, but this opens up the possibility for the two samples to have different sectoral compositions. For example one would expect that a random network with firms evenly distributed across 20 industries would have greater cross-industry relations than a network with fewer industries and greater concentration of firms within even fewer industries. The propensity to interlock across industrial boundaries could also be a function of 'false boundaries' whereby two industry codes in fact differentiate between two dimensions of the same industry (such as two different codes within the IT industry for example). These epistemological challenges are addressed by conducting the analysis at two levels of sectoral classification, the 2-digit SIC codes (and their equivalent NAICS codes), and the Division level which classifies industries into 10 broad categories, thus minimizing the risk of 'false boundaries'.

Let us begin by exploring the sectoral composition of the sampled firms in the two regions in each cross-section. Table 15 shows the number of 2-digit SIC codes represented by the samples of the largest firms in the two regions in 1980, 1995 and 2010. The number of industries in LA decreased between 1980 and 1995 then increased by a third between 1995 and 2010; in the Bay Area the number of industries decreased from 30 in 1980, to 26 in 1995 and 21 in 2010. These figures are consistent with broader industry trends in the two regions which were analyzed for key tradable industries in Part II, namely greater specialization in the Bay Area's industrial mix, and diversification in LA over the period under investigation.

Table 15: *Number of 2-Digit SIC codes represented by the sampled firms in the two regions.*

	LA	SF
1980	32	30
1995	28	27
2010	36	21

Source: Author's calculations using SIC codes assigned to each firm by the IRS, and re-categorized where deemed appropriate.

In addition to increasing industrial diversification in the industrial composition of sampled firms in LA and greater specialization in the Bay Area by 2010, the concentration of firms within specific industries in the Bay Area in 2010 increased substantially. The three most represented industries in the Bay Area (ie. The three industries representing the greatest number of firm in the sample of 70 firms in 2010) represent a total of 12 firms in the LA sample, and 37 firms in the Bay Area Sample. Whatever the cut-off this finding holds: Greater concentration in the Bay Area. Recall the LA sample consisted of 36 industries in 2010, and 21 in the Bay Area; if the analysis is restricted to 25% of the most represented industries in each region, thus the 9 most represented industries in LA and the 5 most represented in the Bay Area, results show that 65% of all Bay Area sampled firms fall into the 5 most represented industries; in LA's sample 45% of all firms fall into the 9 most represented LA industries; a much smaller number of firms across a greater number of industries. These results of greater concentration hold for 50% cut-off and 75% cut-off, as presented in table 16 below.

Table 16*: Percent of sampled firms found in the 25%, 50% and 75% of each region's industries (ranked by number of firm)*

% of most represented Industries	LA % of Sampled Firms	SF % of Sampled Firms
25%	47%	65%
50%	70%	82%
75%	85%	90%

Source: Author's calculations (To be interpreted as follows: 25% of LA's industries, ranked by number of firms, represents 47% of all sampled firms, compared to 65% in the Bay Area).

In addition to greater and increasing industrial specialization of the largest firms in the Bay Area (fewer industries), and greater concentration of firms in few industries, over time the Bay Area's industrial mix has been much more consistent, with few changes in its top-three most represented industries. As presented below in Table 17, the three most represented 2-Digit SIC codes in the Bay Area are the same in 1980, 1995 and 2010, with the only exception being 'Chemicals & Allied Products' in third place in 1980 (with just four firms), replaced by 'Business Services' with five firms in 1995 and moving up to first position with 10 firms in 2010. In LA on the other hand each of its most represented industries is replaced by a different industry in each cross section, with the only exception being 'Insurance Carriers' with 5 firms in 1995 and 4 firms in 2010.

Table 17: *Number of firms in the 3 most represented 2-Digit SIC codes in 1980, 1995 and 2010*

Southern California:			
Year	**SIC**	**Industry**	**#Firms**
1980	35	Industrial Machinery & Equipment	5
	13	Oil and Gas Extraction	4
	20	Food & Kindred Products	4
1995	54	Food Stores	6
	63	Insurance Carriers	5
	37	Transportation Equipment	4
2010	15	General Building Contractors	4
	38	Instruments & Related Products	4
	63	Insurance Carriers	4

Bay Area:		
SIC	**Industry**	**#Firms**
36	Electrical and Electronic Equipment	9
35	Industrial Machinery & equipment	8
28	Chemicals & Allied Products	4
35	Industrial Machinery & Equipment	11
36	Electrical & Electronic Equipment	9
73	Business Services	5
73	Business Services	14
36	Electrical & Electronic Equipment	13
35	Industrial Machinery & Equipment	10

Source : Author's calculations.

Given the greater and increasing degree of specialization and firm concentration in the Bay Area over time, one would expect a random network between firms to generate more cross-industry ties in LA than in the Bay Area. To illustrate this point more clearly, imagine in one region there are 100 firms which are evenly distributed across 50 industries, and in another region there are 100 firms heavily concentrated in a few industries, with 30 industries

all together in both regions. If firms in each region randomly chose firms to share directors with, one would expect the region with more numerous industries and more evenly distributed firms to have a greater number of cross-industry relations. The findings that follow however show otherwise.

INDUSTRY PAIRS AND CROSS-INDUSTRY TIES

There are many different ways to measure the extent of cross-industry relations. To begin with, the analysis is restricted to the number of distinct *industry pairs* and *cross-industry ties*. A distinct *industry pair* exists when two industries are connected by one or more directorate interlocks. So for example a board member of an Aerospace firm who also sits on the board of a Communications firm would generate the unique industry pair Communications-Aerospace. *Cross-industry ties* measure the number of board interlocks that link firms in different industries. So for example if three firms in Communications are linked to one firm in Aerospace, that would count as three cross-industry ties, because each board interlock across industries is counted as a cross-industry tie.

These two measures capture different aspects of cross-industry bridging, the former offering a sense of the number of industry pairs that are linked through board interlocks, the latter the total number of board interlocks that cross industrial boundaries, irrespective of the number of industries spanned. As will become evident from this and subsequent research, the evidence from multiple perspectives points to the same conclusion: Much greater bridging across industries in the Bay Area over time.

The number of distinct industry pairs and cross-industry ties falls in both regions over the period, but much more so in LA. While in 1980 LA enjoyed 65 distinct industry-pairs and 94 cross-industry ties, similar to the Bay Area's 57 industry pairs and 86 cross-industry ties,

by 2010 LA had 22 industry-pairs and 27 cross-industry ties compared to 30 industry pairs and 52 cross-industry ties in the Bay Area. Contrary to what would be expected from a random network, the Bay Area network has more inter-firm relations that "bridge" distinct industries than Southern California, despite the much more specialized and concentrated Bay Area economy.

THE STRENGTH OF INTER-INDUSTRY TIES

The "strength" of ties, for the purposes of this research, consists of the number of board interlocks that connect firms in a given industry to firms in other industries. Whereas in the previous section the number of distinct industry pairs and total number of cross-industry ties were analyzed, here the analysis focuses on the number of board interlocks that connect firms in each industry with firms in other industries. So for example this analysis will measure the number firms in a given industry that share board members with firms in other industries (whether one or more), thus revealing the number of cross-industry relations by industry, and allowing us to rank industries by their number of cross-industry relations, thus revealing specific industries with the greatest number of cross-industry ties.

In1980 LA and the Bay Area had 5 and 6 industries with more than 10 relations[10] with other industries respectively. In both regions the two industries with the greatest number of relations with firms in other industries were 'Depository Institutions' and 'Electric, Gas & Sanitary Services', with 26 ties each in LA, and 30 and 16 each respectively in the Bay Area. Overall, industries had on average 5.7 ties to other industries in both regions (mean degree). In the early 1980s, there were several California and regional banks such as Security Pacific

[10] In 1980 and 1995, the number and distribution of industries with fewer than 10 bridging relations to other industries were similar in the two regions. Therefore, for ease of presentation, I present findings for industries with 10 or more cross-industry ties.

Corp and Western Bancorp in Southern California and Wells Fargo and Bankamerica Corporation in the Bay Area, whose board members were deeply embedded civic leaders, and the same is true of Electric, Gas and Sanitary Services, provided privately by PG&E in the Bay Area and Southern California Edison in Southern California, in addition to the public provider LADWP. This cross-industry analysis is thus picking up on these well-known dimensions of corporate power and civic leadership in the early 1980s.

By 1995 LA had just 2 industries with more than 10 relations with other industries; 'Electric, Gas and Sanitary Services' with 18 relations and 'Depository Institutions' with 17. The Bay Area had 4, with the two most connected being 'Communications' with 26 ties, driven by Pacific Telesis Group, Pacific Bell and Vodaphone America, and 'Water Transportation' (freight shipping) with 21. The average number of relations to other industries had decreased in LA from 5.7 in 1980 to 3.7 in 1995, while the Bay Area maintained a relatively high mean degree of 5.2. The other two industries in the Bay Area with more than 10 relations with other industries were 'Nondepository Credit Institutions' with 21 cross-industry ties and 'Security, Commodity Brokers, and Services' with 10 cross-industry ties.

By 2010 in Southern California's corporate network there was not a single industry with 10 or more ties to other industries, the maximum degree being just 5, and the mean industry degree was a mere 1.5 (down from 5.7 in 1980 and 3.7 in 1995). The Bay Area cross-industry network however had maintained its level of cross-industry relations since 1995, with 4 industries with 10 or more ties to other industries, a mean degree of 5.0 and a maximum degree of 21 for 'Business Services', closely followed by 'Industrial Machinery and Equipment' with 20 cross-industry ties, and 'Electrical & Electronic Equipment' and 'Depository Institutions' with 10 cross-industry ties each. Apart from Depository Institutions,

the latter three industries are the electronics industry and its associated sectors. While the Bay Area corporate network reflects the region's specialization in the electronics industry, LA's corporate network fragments, echoing broader industrial fragmentation of the Southern California economy. These results thus reflect decreasing focus of the LA economy and increasing focus of the Bay Area economy. Yet board interlocks in the Bay Area cross industrial boundaries much more than in LA. These results are presented in Table 18 below.

Table 18: *Industries with 10 or more cross-industry interlocks in 1980, 1995 and 2010, LA and the Bay Area.*

1980-LA

2-Dgt SIC	**Industry name**	**# cross-industry Ties**
_60	Depository institutions	26
_49	Electric, Gas, & Sanitary Services	26
_35	Industrial Machinery & Equipment	18
_38	Instruments & Related Products	12
_26	Paper & Allied Products	10
Mean Degree	**5.7**	
Sum	94	
Maximum	26	

1980-SF

2-Dgt SIC	Industry name	# cross-industry Ties
_60	Depository Institutions	30
_49	Electric, Gas, and Sanitary services	16
_38	Instruments & Related Products	11
_54	Food stores	11
_63	Insurance Carriers	10
_24	Lumber & Wood Products	10

Mean Degree	**5.7**
Sum	86
Maximum	30

1995-LA

2-Dgt SIC	Industry name	# cross-industry Ties
_49	Electric, Gas & Sanitary Services	18
_60	Depository Institutions	17

Mean Degree	**3.7**
Sum	52
Maximum	18

1995-SF

2-Dgt SIC	Industry name	# cross-industry Ties
_48	Communications	26
_44	Water Transportation	21
_61	Nondepository Credit Institutions	11
_62	Security, Commodity Brokers & Services	10

Mean Degree	**5**
Sum	68
Maximum	26

2010-LA

2-Dgt SIC	Industry name	# cross-industry Ties
n/a	n/a	none>9

Mean Degree	**1.5**
Sum	27
Maximum	5

2010-SF

2-Dgt SIC	Industry name	# cross-industry Ties
73	Business Services	21
35	Industrial Machinery & Equipment	20
36	Electrical & Electronic Equipment	10
60	Depository Institutions	10

Mean	**5**

Degree	
Sum	52
Maximum	21

Source: Author's calculations.

By 2010 the Bay Area network of directorate interlocks had almost twice the number of cross-industry relations than LA's network (52 versus 27 in LA), and over 4 times the maximum degree of LA's most connected industry: LA's most connected industry had 5 board interlocks with firms in other industries, compared to 'Business Services' which had 21 relations with firms in other industries. The Bay Area by 2010 has more cross-industry relations overall, a higher average number of cross-industry relations per industry, and a larger number of highly connected industries. These findings so far corroborate the hypothesis of greater cross-realm relations amongst the Bay Area's corporate structure, or what has been conceptualized as the 'intellectual world of production'. The analysis that follows shifts from a focus on the strength of ties to a focus on the breadth of ties.

THE BREADTH OF INTER-INDUSTRY TIES

The previous section sheds light on the strength of inter-industry ties, indicating that they are indeed stronger in the Bay Area than Southern California; here the analysis focuses on the breadth of such ties, measured as the total number of *industries* to which each industry is connected. To illustrate this point, the above research revealed that 'Business Services' in the Bay Area in 2010 has a total of 21 directorate interlocks to firms in other industries, but this does not indicate whether those ties are broad, to many other industries, or narrow, consisting of strong ties to one or a small number of other sectors.

Data are presented for all firms that are linked to 5 or more industries only. This threshold was chosen for presentation purposes only, since the distribution of industries linked to fewer than 5 industries is similar in the two regions. In 1980 the two regions were very similar, with LA slightly ahead in terms of its breadth of inter-industry connections. LA had 11 industries tied to 5 or more industries, and the Bay Area had 8. The three industries that were connected to the most number of other industries in LA were 'Electric, Gas and Sanitary Services', which was connected to 13 other industries, and 'Industrial Machinery & Equipment' and 'Depository Institutions' which were both connected to 12 other industries. In the Bay Area 'Depository Institutions' was connected to 14 other industries, 'Electric, Gas & Sanitary Services' to 10 and 'Food services' to 7 other industries.

By 1995 however, LA had only 7 industries that were connected to 5 or more other industries and 11 in the Bay Area. LA's top-3 industries in 1995 were 'Depository Institutions' (connected to 8 industries), 'Electric, Gas & Sanitary Services' and 'Petroleum & Coal products' (both connected to 6 other industries each). The Bay Area's were 'Water Transportation' (freight services) and 'Communications', connected to 10 industries each, and 'Security, Commodity Brokers & Services' and 'Non-depository Credit Institutions' each connected to 6 other industries.

By 2010 LA had no industries connected to 5 or more other industries, and the Bay Area had 4: 'Industrial Machinery & Equipment' connected to 7 other industries, and 'Depository Institutions', 'Instruments & Related Products' and 'Business Services' each connected to 6 other industries.

While the Bay Area's corporate network has fewer cross-industry relations over time, it maintains a relatively much higher number of cross-industry relations despite overall

industrial specialization and industrial concentration of its largest firms. The results of this analysis are presented in Table 19 below.

Table 19: *Industries connected to 5 or more industries in 1980, 1995 and 2010, LA and the Bay area.*

LA-1980

sic	**SIC Name**	**Degree**
_49	Electric, Gas & Sanitary Services	13
_35	Industrial Machinery & Equipment	12
_60	Depository Institutions	12
_38	Instruments & Related Products	9
_26	Paper & Allied Products	8
_16	Heavy Construction Contractors	6
_53	General Merchandise Stores	6
_13	Oil & gas extraction	5
_20	Food & Kindred Products	5
_32	Stone, Clay, Glass & Concrete Products	5
_37	Transportation Equipment	5

SF-1980

sic	**SIC Name**	**Degree**
60	Depository Institutions	14
49	Electric, Gas & Sanitary Services	10
54	Food Stores	7
38	Instruments & Related Products	7
48	Apparel & Accessory Stores	7
24	Lumber & Wood Products	6

36	Electrical & Electronic Equipment	6
58	Eating & Drinking Places	5

LA-1995

sic	SIC Name	Degree
_60	Depository Institutions	8
_49	Electric, Gas & Sanitary Services	6
_29	Petroleum & Coal Products	6
_13	Oil & Gas Extraction	5
_26	Paper & Allied Products	5
_38	Instruments & Related Products	5
_73	Business Services	5

SF-1995

sic	SIC Name	Degree
44	Water Transportation	10
48	Communications	10
62	Security, Commodity Brokers & Services	6
61	Nondepository Credit Institutions	6
56	Apparel & Accessory Stores	5
51	Wholesale Trade-Nondurable Goods	5
49	Electric, Gas & Sanitary Services	5
60	Depository Institutions	5
35	Industrial Machinery & Equipment	5
73	Business Services	5
42	Motor Freight Transportation & Warehousing	5

LA-2010

SIC

N/A	N.A	NONE>4

SF-2010

	SIC	
sic	**Name**	**Degree**
35	Industrial Machinery & Equipment	7
60	Depository Institutions	6
38	Instruments & Related Products	6
73	Business Services	6

Source: Author's calculations.

The cross-industry analysis so far has revealed that the Bay Area's high-end corporate structure has a greater number of cross-industry pairs (distinct industries connected to one another with at least one board interlock), a greater number of relations that cross industrial boundaries, and a greater number of industries that are broadly connected to other industries. These three different perspectives on cross-industry relations within the Bay Area and Southern California's high-end corporate network paint the same picture: That of the Bay Area maintaining relatively high levels of cross-industry relations throughout the 1980 to 2010 divergence period of severe corporate restructuring, and the fragmentation and collapse of cross-industry relations in LA's high-end corporate network. The analysis now turn to the most connected industry pairs, in order to gain further insights and corroborating evidence from the structure of the two regions' high-end corporate 'intellectual worlds'.

THE STRONGEST INDUSTRY PAIRS

This picture of the overall strength of inter-industry connections, and their breadth, can be further deepened by examining the pairs of industries with particularly strong connections in the two regions. For example we know from the above analyses that 'Business Services' in the Bay Area had a total of 21 cross-industry ties and was connected to 6 other industries in 2010, but we do not know exactly what industries 'Business Services' was most connected with, and by how many board interlocks. In this section cross-industry pairs are ranked by their number of board interlocks. Again for the purpose of clarification and simplicity, the presentation of this analysis is restricted to industry-pairs with 2 or more board interlocks, because most industry pairs had either one or two ties, and thus cross-regional differences and changes over time are most evident for industry-pairs with more than two board interlocks.

In 1980 LA had 1 cross-industry pair with more than 2 relations: 'Depository Institutions' and 'Electric, Gas & Sanitary Services', which was linked by 9 board interlocks. The Bay Area had 3 cross-industry pairs with more than 2 ties: 'Industrial Machinery & Equipment' and 'Electrical & Electronic Equipment'; 'Depository Institutions' and 'Apparel & Other Textile Products'; and 'Depository Institutions' and 'Food Stores', each pair linked by 4 ties. Notice the seeds of the electronics industry evident in cross-industry board interlocks as far back as 1980 in the Bay Area.

By 1995 both regions had increased their number of cross-industry pairs with more than 2 ties, to 3 in LA and 5 in the Bay Area. While LA's cross-industry pairs with more than 2 ties consisted of 6 different industries, in the Bay Area the 'Communications' industry appeared in 4 out of the 5 cross-industry pairs with more than 2 ties, consistent with the

region's greater industrial specialization. The 'Communications' industry had 5 ties to 'Non-depository & Credit Institutions', 4 ties to 'Water Transportation' (freight services), 4 ties to 'Depository Institutions', and 3 ties to 'Chemicals & Allied Products', again driven by Pacific Telesis Group, Pacific Bell and Vodaphone America.

By 2010, consistent with previous findings, the LA cross-industry network had fragmented completely, with no cross-industry pairs with more than 2 ties. The Bay Area had 4 such cross-industry pairs, with 'Business Services' enjoying the greatest number of ties across industrial boundaries. 'Business Services' had 11 ties with 'Industrial Machinery & Equipment', the greatest number of ties across all industry pairs in any of our regional samples dating back to 1980, and 5 ties to 'Electrical & Electronic Equipment'. While the LA cross-industry network almost disappeared by 2010, the Bay Area's had maintained and even increased the number of cross-industry relations with more than 2 ties, and had developed the greatest strength of ties of any cross-industry pair in any of the cross-section samples. These results are presented in Table 20 below:

Table 20: *Cross-industry pairs with more than 2 ties, 1980, 1995 and 2010, LA and the Bay Area.*

LA-1980	**# Ties**
Depository Institutions (60)- Electric, gas & Sanitary services (49)	9

SF-1980	**# Ties**
Industrial Machinery & Equipment (35) - Electrical and electronic equipment (36)	4
Depository Institutions (60)- Apparel & Other Textile Products (23)	4
Depository Institutions (60) - Food Stores (54)	4

LA-1995	**# Ties**
Depository institutions (60) - Electric, gas, and sanitary services (49)	7
Insurance carriers (63) - Health services (80)	4
Instruments and related products (38) - Chemicals and allied products (28)	3

SF-1995	**# Ties**
Communications (48) - Nondepository credit institutions (61)	5
Communications (48) - Water transportation (44)	4
Communications (48) - Depository institutions (60)	4
Communications (48) - Security, commodity brokers, and services (62)	3
Water transportation (44) - Chemicals and allied products (28)	3

LA-2010	**# Ties**
N/A	NONE>2

SF-2010	**# Ties**
Business services (73) - Industrial machinery and equipment (35)	11
Business services (73) - Electrical and electronic equipment (36)	5
Depository institutions (60) - Electric, gas, and sanitary services (49)	3
Industrial machinery and equipment (35) - Electrical and electronic equipment (36)	3

Source: Author's calculations.

LA and the Bay Area's high-end corporate network in the 1980s spanned across banking and utilities, but what is also evident in the Bay Area's network is the early relational ties to the electronics industry. By 2010 LA's cross-industry network fragments as it does in all the above analyses, and the relational infrastructure of the electronics industry becomes

evident in the Bay Area. We are also seeing a shadow indicator of the much remarked loss of banking and corporate headquarters in Southern California over the past two to three decades. This loss of traditionally civically-involved corporate actors in LA is reflected in these networks as a gradual loss of corporate network cohesion between 1980 and 1995, and virtual disappearance of inter-firm and cross-industry networks by 2010.

CONTROLLING FOR INDUSTRIAL COMPOSITION

Are the Bay Area's cross-industry relations predominantly driven by the IT industry, or is the IT industry's relational infrastructure embedded in a broader network of cross-industry relations? This question is addressed with two additional studies, the first conducts the analysis at a much broader level of industrial classification, and the second restricts the analysis to the largest IT firms in the two regions.

CROSS-DIVISION RELATIONS

Industries that are 'closer' to one another in technology or markets might be more likely to know each other socially and thus appoint each other on the boards of their corporations. In order to control for the possibility that the 2-digit SIC classification might be 'over-counting' cross-industry relations due to 'false boundaries', cross-industry analysis in this section is conducted at the much broader 'division' level, which categorizes business activity into 10 broad industrial categories. The probability that industry pairs at the division level are in fact linking two firms within the same broader sector is very low; divisions indicate sectors that are not technologically proximate. Therefore if more directorate interlocks are found across divisions, then it is likely that these connections are independent of specialization and indicate a more cross-cutting relational infrastructure amongst the largest corporations in the Bay Area.

In 1980 LA and the Bay Area had 8 and 7 Divisions present in my two regional samples, and by 2010 LA had 8 and the Bay Area 6, consistent with the greater specialization of the Bay Area. It is noteworthy that the specialization patterns show up at such an aggregate level of industrial analysis. First, the number of distinct cross-division pairs is compared over time. So if division A is connected to division B, this counts as 1 cross-division pair, irrespective of the number of board interlocks across this division pair.

The number of cross-division pairs has consistently been greater in LA, with 19 versus 14 in 1980 and 11 versus 8 in 2010, albeit narrowing over time (see Table 21). As will become evident is the analysis that follows however, such an overview masks extreme fragmentation in LA.

Table 21: *Total cross-division pairs*

	LA	**SF**
1980	19	14
1995	13	11
2010	11	8

Source: Author's calculations.

NUMBER OF RELATIONS

Consistent with all the above findings, divisions in the two regions had similar numbers of total cross-division board interlocks in 1980. The LA network had 77 cross-Division board interlocks, slightly above the Bay Area network's 69. Manufacturing was the most connected division to other divisions in both regions, with 49 cross-division links in LA and 43 in the Bay Area. 'Finance, Insurance and Real Estate' (FIRE) and 'Transport, Communications, Electrical, Gas and Sanitary Services' were in the top-three in both regions. All divisions are ranked by their number of cross-division links in table 22 below. The two

regions' corporate networks were remarkably similar in terms of cross-division relations in 1980.

By 1995 the Bay Area had developed more cross division links than LA (a total of 52 cross-Division links compared to LA's 41). Unlike the 1980 networks, in 1995 the two regions' divisions differed a great deal. In LA the most connected division became FIRE with a total of 21 cross-division links, almost half the Bay Area's most connected division which was 'Transportation, Communications, Electric, Gas and Sanitary Services' with 41 cross-division ties. At the division level the decrease in cross-industry relations in LA is evident between 1980 and 1995, with Manufacturing losing 59% of its cross-division board interlocks between 1980 and 1995, with no other industry picking up the 'slack'. Manufacturing in the Bay Area lost 74% of its cross-division board interlocks between 1980 and 1995, but the difference is that 'Transportation, Communications, Electric, Gas and Sanitary Services' picked up the slack with 41 cross-division board interlocks, almost as high as Manufacturing in 1980 in SF which had 43 cross-division links. FIRE also picked up the slack in SF with 27 cross-division links, more than Manufacturing in second place in LA.

By 2010 LA's total number of cross-division board interlocks had decreased to a mere 19, a decrease of 75% since 1980. The Bay Area on the other hand had 43 cross-division board interlocks, more than double LA's (a decrease of 38% since 1980). Manufacturing in LA was the most connected division again, albeit with a mere 8 cross-division links, followed by construction and FIRE with 7 links each. Manufacturing was also the most connected division in the Bay Area, albeit with 32 cross-division board interlocks, followed by Services with 23 and FIRE with 14.

Table 22: *Total cross-division links by division, 1980, 1995 and 2010.*

1980-LA	**#**	**1980-SF**	**#**
Manufacturing	49	Manufacturing	43
Trp, Comm, Elec, Gas & San Service	32	FIRE	36
FIRE	26	Trp, Comm, Elec, Gas & San Service	29
Retail Trade	14	Retail Trade	16
Construction	12	Mining	6
Mining	7	Wholesale Trade	6
Wholesale Trade	7	Services	2
Services	7	Agri, Frstry & Fish	0
Agri, Frstry & Fish	0	Construction	0
TOTAL	**77**	**TOTAL**	**69**

1995-LA	**#**	**1995-SF**	**#**
FIRE	21	Trp, Comm, Elec, Gas & San Service	41
Manufacturing	20	FIRE	27
Trp, Comm, Elec, Gas & San Serv	18	Retail Trade	13
Services	12	Manufacturing	11
Mining	5	Wholesale Trade	6
Construction	2	Services	5
Wholesale Trd	2	Mining	1
Agri, Frstry & Fish	1	Agri, Frstry & Fish	0
Retail Trade	1	Construction	0
TOTAL	**41**	**TOTAL**	**52**

2010-LA	**#**	**2010-SF**	**#**
Manufacturing	8	Manufacturing	32
Construction	7	Services	23
FIRE	7	FIRE	14
Trp, Comm, Elec,	4	Retail Trade	7

Gas & San Serv			
Services	4	Trp, Comm, Elec, Gas & San Service	5
Mining	3	Wholesale Trade	5
Retail Trade	3	Construction	0
Wholesale Trade	2	Mining	0
Agri, Frstry & Fish	0	Agri, Frstry & Fish	0
TOTAL	**19**	**TOTAL**	**43**

Source: Author's calculations.

This analysis shows that the Bay Area's cross-industry relations are predominantly driven by corporate board interlocks that cross the boundaries of the three quintessential industries of the 'new economy': High-tech manufacturing, high-end services and finance.

MOST CONNECTED DIVISION PAIRS

We now examine and contrast the number of board interlocks between division-pairs. This analysis reveals the starkest differences in the two regions' cross-industry networks. The two regions' corporate networks were remarkably similar in 1980, with exactly the same three most connected division-pairs: Manufacturing-Finance, Manufacturing-Transport and Transport-Finance. In Table 23 division-pairs connected by more than 3 board interlocks are ranked by the number of relations that connect them. By 1995 Manufacturing and Finance had maintained their 18 board interlocks in the Bay Area, but this division pair, despite remaining the most connected in LA, had lost a third of its board interlocks; it was connected by just 8 ties by 1995.

By 2010 Manufacturing and Services in the Bay Area had become the most connected division pair, with 21 board interlocks, more than any other division pair in any of the

networks since 1980. The LA corporate network on the other hand did not have a single division pair with more than 2 board interlocks. Manufacturing and Services and Manufacturing and Finance, the two most connected industries in the Bay Area in 2010, are the well-known drivers of high-tech sectors such as electronics and biotechnology. Relations between these industries have been shown in other research reviewed briefly above to be integral to industrial genesis, innovation and high-end entrepreneurship. The Bay Area's 2010 corporate network is picking up on this social dimension of the high-tech economy in the Bay Area.

Table 23: *Number of links between division-pairs with more than 3 ties.*

LA-1980		**SF-1980**	
Division pairs	**# Links of total 77**	**Division pairs**	**# Links of total 69**
Manufacturing-Finance	12	Manufacturing -Finance	18
Manufacturing –Transport	12	Manufacturing - Transport	15
Transport –Finance	9	Transport-Finance	7
Manufacturing – Construction	7	Retail-Finance	7
Manufacturing -Retail	6	Manufacturing -Retail	5
Manufacturing -Mining	5	Transport-Retail	4
Manufacturing -Wholesale	4		
Transport -Retail	4		

LA-1995		**SF-1995**	
Division pairs	**# Links of total 41**	**Division pairs**	**# Links of total 52**
Manufacturing -Finance	8	Transport-Finance	18
Manufacturing -Transport	7	Transport-Retail	9
Transport -Finance	7	Manufacturing-	6

		Transport	
Services-Finance	4	Manufacturing -Finance	4
Services-Transport	4	Transport -Wholesale	4

LA-2010		**SF-2010**	
Division pairs	**# Links of total 19**	**Division pairs Names**	**# Links of total 43**
None > 3	n/a	Manufacturing -Services	21
		Manufacturing -Finance	6
		Manufacturing - Wholesale	5
		Finance-Retail	5

Source: Author's calculations.

Decreasing interlocks in the period between 1980 and 1995 in both regions is consistent with findings in the wider literature on the US corporate network of board interlocks. One of the most ambitious and widely-cited studies in this field, by Barnes and Ritter in 2000, analyzed the evolution of 250 US corporations between 1962 and 1995 and found that "the network of corporate ties in 1995 was less dense, less concentrated, and contained few subgroups". They also found a decrease in the centrality of financial institutions and insurance companies, results reflected in the above findings as well. The authors attribute the transformations in the structure of the corporate elite networks of board interlocks to "mega-mergers… economic concentration, globalization, and changing regulatory environments" (Barnes and Ritter, 2001-p. 26).

Davis and colleagues (Davis et al, 2003) analysed the evolution of board interlocks amongst 600 to 648 of the largest US listed firms on the Fortune 500 and the Fortune 1000 companies in 1982, 1990 and 1999. They report that despite massive changes in the

companies within the network, economic shocks and new norms of hiring independent directors, the network's interlocking structure did not appreciably change (Davis et al, 2003). Consistent with the findings of Barnes and Ritter however, the authors report a decrease in the mean degree, the maximum degree, and the number of firms in the largest component.

The above findings are thus consistent with the overall trend in the national corporate elite network. The fragmentation in the LA network of board interlocks is thus uncharacteristic of the changes seen in the broader US corporate network, and contrast sharply with the evolution of the Bay Area network since 1980. As discussed in the introduction to Part II, the US corporate network reflects the aggregate US-wide network which masks the uneven regional-level dynamics whereby some regions maintained or gaining connections across their high-end corporate structures, while others, such as LA, experienced the fragmentation of their high-end corporate structures in the face of the tumultuous changes throughout the 1980 to 2010 period of rapid economic change and corporate restructuring.

In any case, though a number of questions about the sources of change remain and are beyond the scope of this research, results from the above analyses all point in the same direction: there are much greater cross-industry relations in the Bay Area, and this is all the more striking given the region's greater industrial specialization and firm concentration. There is a fair chance that the Bay Area's high level of industrial bridging amongst its corporate elites is driven by a regional effect rather than a function of technological proximity between 2-digit SIC categories. Corporate leaders in the Bay Area over time become much more likely to 'talk' to their counterparts in different industries than do business leaders in Southern California. Before examining the degree to which the two regions' high-end

corporate networks cross geographic/jurisdictional boundaries, an additional control is conducted by comparing the largest 50 firms within the two regions' IT industries in 2010.

CONTROLLING FOR IT-DRIVEN RELATIONS

Even the above Division-level analysis shows that cross-industry relations, although connecting different industries (manufacturing, finance and high-end business-services) might still be driven by the relational nature of the IT industry (thus an industry rather than a regional effect). If that were true, then one would expect the IT industries across regions to enjoy relatively high levels of cross-firm relations. In order to control for the IT industry effect of cross-industry relations, here the largest 50 IT firms are analyzed for the year 2010. If the Bay Area's largest IT firms are more connected than LA's, then this finding could be presented as evidence that it is the Bay Area's IT industry that is driving the inter-industry relations identified above, rather than the nature of the IT industry in general.

The network structure of the 50 largest IT firms in LA and the Bay Area are illustrated in figures 4a and 4b respectively. While only 6 firms in the LA network (12%) are connected to at least one other IT firm, 27 firms are connected to at least one other firm in the Bay Area network (54%). This shows that even after controlling for IT industry effects, the Bay Area network is still more connected than LA's.

Figure 4a: *LA IT Network of board interlocks, 2010*

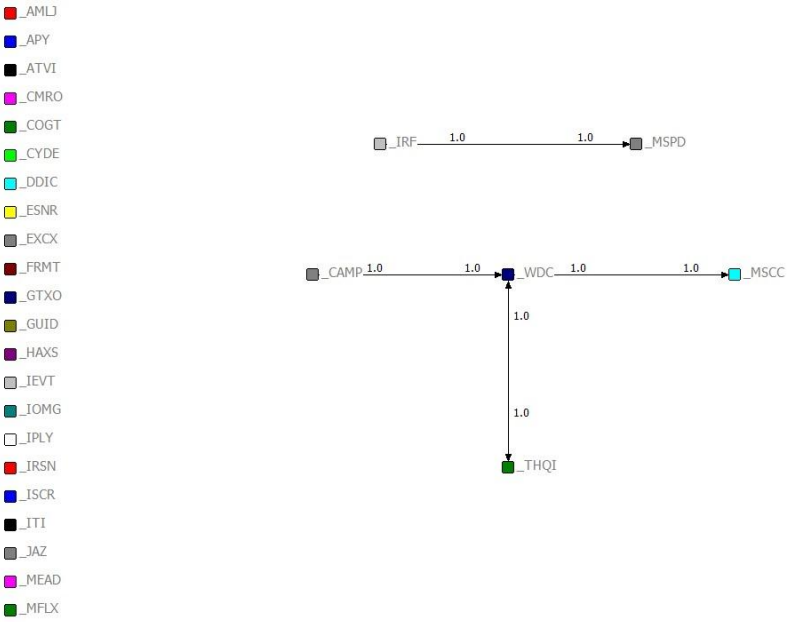
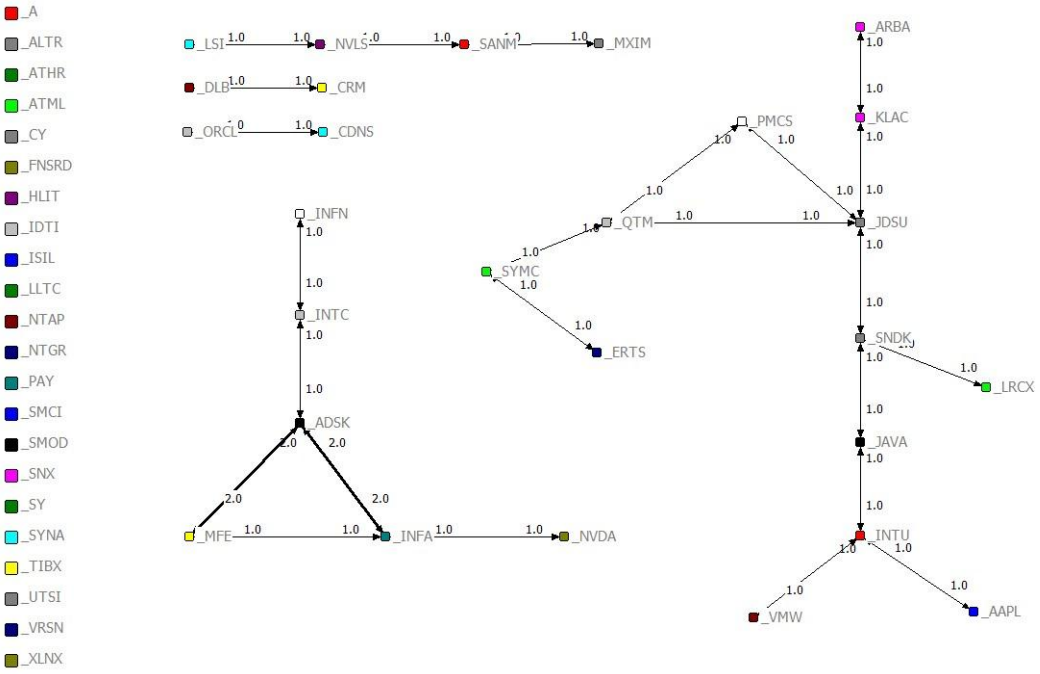


Figure 4b: *Bay Area IT network of board interlocks, 2010*



Source: Author's network analysis using UCINET/NetDraw.

There is one caveat however; as we know from previous research that larger firms are more likely to interlock with other large firms than smaller firms, it must be noted that the top-50 Bay Area IT firms are much larger than LA's; the total revenues of the Bay Area's IT corporates amounts to about $200 Bln. in 2010, compared to about $50 Bln. in LA's, about four times the size. These samples thus do suffer from size-bias. Having said this, notice the difference between the Bay Area's IT network and its broader 2010 corporate network analyzed above: The 2010 corporate network had 78% of firms connected to at least one other firm, compared to 54% in the IT network, and moreover, 54% of firms in the overall corporate network were connected to each other in the largest component, compared to only 26% in the IT network.

The difference between the LA and Bay Area IT networks, and the difference between the IT and broader corporate networks in the Bay Area offer compelling evidence that the degree of corporate interlocks, overall and across industrial boundaries, is driven by Bay Area regional characteristics (i.e the regional specificity of the Bay Area's IT industry) rather than simply the nature of IT industries everywhere. The overall evidence on cross-industry relations in the two regions' high-end corporate networks is compelling and consistent across multiple measures and industrial classifications: The Bay Area's network is consistently more connected and crosses industrial boundaries between 1980 and 2010, whereas LA's network fragments decisively over time. To what extent do corporate networks span across the geographic/jurisdictional landscape of the two regions? This is the subject of the following investigation.

THE GEOGRAPHY OF BOARD INTERLOCKS

The analysis in this section explores the degree to which the corporate networks under investigation crossed geographic boundaries in the two regions. This is ascertained by analyzing the degree to which board interlocks connect corporations which are headquartered in different cities across the region. The question of the geographic scope of the corporate social structure is important because if firms are located in different cities across a regional landscape, social relations between firms must cross geographic boundaries. If social relations across the corporate landscape are fragmented and less likely to cross geographic boundaries (i.e. if corporate leaders are less likely to know and talk to corporate leaders in different cities), then this reduces the scope for introductions and re-combinations of people, firms and institutions in pursuit of lucrative commercial ends, and reduces the probability of cross-realm transposition. Geographic fragmentation can thus be conceived as a blockage to the full expression of potential agglomeration externalities in the form of a transposition-enabling socio-relational context.

It is possible of course that asocial relation between two interlocked firms is driven by two directors who live next door to each other, and are equidistant to the two firms in different cities. There is no reason to believe why this should happen more often in one region than the other however, thus in the aggregate cross-city board interlocks are expected to involve greater numbers of cross-city social relations overall, irrespective of exceptions which are assumed to be equal in both regions.

First it must be noted that the total number of cities that play host to sampled corporations is not equal, which is expected given the fact that in 2013 the Southern

California region consisted of 174 cities[11], and the San Francisco Bay Area was comprised of 106 cities. In 1980 there were 24 cities that hosted the LA sample of corporations, and 15 in the Bay Area. There was a significant increase in the number of cities that played host to sampled firms in both regions between 1980 and 1995, up to 31 in LA and 22 in the Bay Area, an additional 7 cities in both regions (thus a greater percentage increase in the Bay Area). There was very little change between 1995 and 2010, with just one less city in both corporate networks (See Table 24).

Table 24: *Number of cities that host at least one of our sampled firms, 1980, 1995 and 2010.*

	LA	**Bay Area**
1980	24	15
1995	31	22
2010	30	21

Source: Author's calculations using city locator in various sources used to build my database of firms.

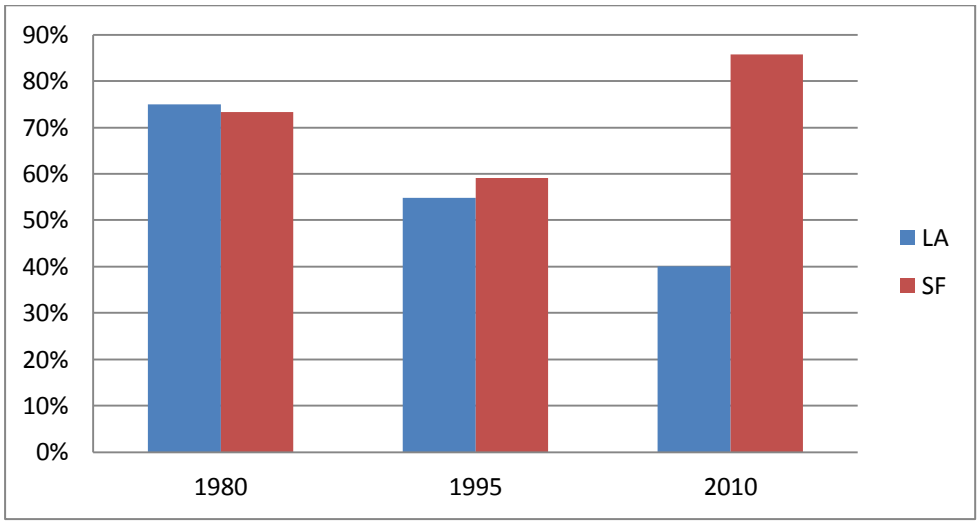
The change over time in the underlying geographic pattern of sampled firms was similar in the two regions, albeit steeper in relative terms in the Bay Area. These numbers reflect the fact that both regions have undergone a similar process of geographic decentralization, with firms moving out of Los Angeles and San Francisco to other core cities within their regions between 1980 and 1995. In 1980 54% of sampled firms were headquartered in Los Angeles. By 1995 that percentage had dropped to 25%, and 19% by 2010. San Francisco was home to 39% of sampled Bay Area firms in 1980, 30% in 1995 and 17% in 2010 (See Appendix 3 for a full ranking of cities by number of firms, percentage of firms, and cumulative percentage of firms in each city).

[11] Source: The California Planner's book of lists <http://ceres.ca.gov/planning/bol/1999/city_by_county.html>

Between 1980 and 2010 the two regions' largest revenue-earning corporations had drifted from old cores to new high tech cities such as Irvine and Pasadena in Southern California, and San Jose and Santa Clara in the Bay Area. In light of the fact that both cross-city networks were similar back in 1980, it is conceivable that changes over time are at least partly due to this geographic de-concentration in the location of corporations in the two regions.

Consistent with findings at the cross-firm and cross-industry levels, both regions had an almost identical percentage of cities connected to at least one other city back in 1980: 75% of represented cities in LA were connected to at least 1 other city, and 73% in the Bay Area. The corporate elite network in both regions decreased in geographic span by 1995, with 55% and 59% of cities connected to at least one other city in LA and the Bay Area respectively. This is not surprising as the number of cities increased substantially over the period (7 cities were added to both samples), thus new relations had to be forged across those new geographic boundaries. By 2010, while the LA network's declining trend continued, with 40% of cities connected to at least one other city in 2010, the Bay Area's corporate network increased its geographic span to 86% of cities connected to at least one other city by 2010 (see Figure 5).

Figure 5: *Percentage of cities connected to at least one other city, 1980, 1995 and 2010*



Source: Author's calculations

Most connected cities in each cross section form a single connected network or component. The big jump in the number of connected cities in the largest component is between 1995 and 2010, when LA and the Bay Area switch dramatically, from 15 connected cities in LA's largest component and 13 in the Bay Area in 1995 to 12 connected cities in LA and 18 in the Bay Area in 2010 (see Table 25, with number of cities in largest component in brackets). By 2010 the number of cities connected to at least one other city in the Bay Area overtook LA both in percentage terms (86% in SF versus 40% in LA) and in absolute terms (18 cities connected to at least one other city in SF versus 12 in LA by 2010). Recall that in 1995 SF had a higher percentage of cities connected to each other – 59% versus 55% in LA - but a lower absolute number of connected cities – 13 in SF versus 17 in LA.

Table 25: *Number of cities connected to at least one other city, with number of cities in largest component in brackets, 1980, 1995 and 2010.*

	LA	**Bay Area**
1980	18 (16)	11 (11)
1995	17 (15)	13 (13)
2010	12 (12)	18 (18)

Source: Author's calculations.

Both the number of cities connected to at least one other city and the size of the largest component paint the same picture: The Bay Area's high-end corporate network becomes more geographically widespread than LA's by 2010. Business leaders in cities across the Bay Area are more likely to 'talk' to one another than in LA.

Not all cities are equally connected to other cities however. In the 1980 and 1995 networks, Los Angeles and San Francisco, the two regions' 'old' central cores, were the most connected cities in each region. Los Angeles was connected to 12 and 11 other cities in 1980 and 1995 respectively, and San Francisco was connected to 8 and 10 other cities in 1980 and 1995 respectively. By 2010 however, Los Angeles became the third most connected city in Southern California, connected to just 4 other cities; San Francisco on the other hand maintained its high level of connectivity in 2010, with links to 10 other cities, followed by Santa Clara, San Jose and Mountain View which were connected to 7 other cities each, all more than Santa Ana which was the most connected city in LA in 2010. Notice the big drop in connections between San Francisco and Oakland, from 11 and 15 relations in 1980 and 1995 respectively, to a mere 2 relations in 2010. By 2010 the high-end corporate social structure had expanded geographically across the Bay Area region, but Oakland was clearly left behind as a mere 2-relations away from complete isolation (see figure 6f).

As the regional corporate base expanded outwards into both regions, the Bay Area's corporate leaders in new urban cores became connected to corporate elites across the region, including those in the 'old' central core of San Francisco. In the LA region however, as new urban cores began hosting the largest corporations in the region, the region's high-end corporate social relations failed to extend across these new regional boundaries.

The decline in Los Angeles' geographic connectivity is even more starkly reflected in the total number of ties it has with other cities. In 1980 there were 53 board interlocks between firms in Los Angeles and other cities. By 1995 this number had declined by about 60% to 22 board interlocks with other cities, and by 2010 it was a mere 8. Firms in San Francisco had 32 relations with firms in other cities in 1980, 27 in 1995 and 22 in 2010. This shows that even though the decline in the number of cities Los Angeles is connected to takes place between 1995 and 2010, the decline in Los Angeles as the center of the corporate elite network began much earlier, evident by the 59% decline in its cross-city board interlocks between 1980 and 1995. Furthermore, the decline in the connectivity of Los Angeles is not replaced by greater number of ties between other cities. The evolution of inter-city networks is presented graphically in Figures 6a to 6f below.

Figure 6a: *LA inter-city network, 1980.*

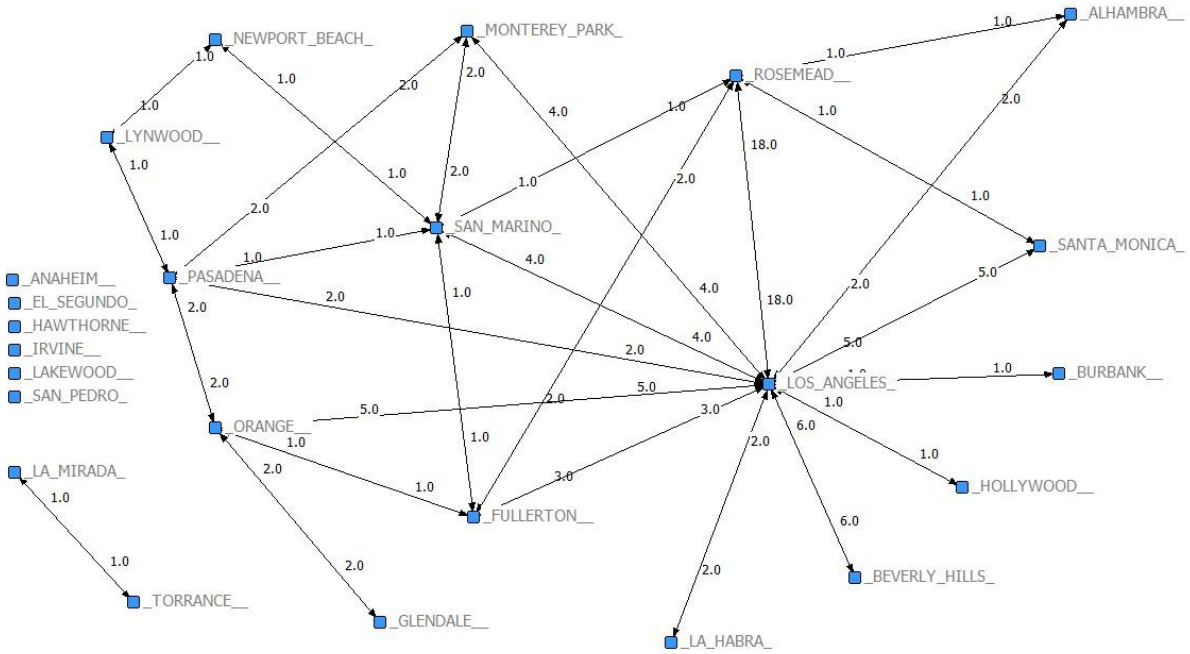


Figure 6b: *Bay Area inter-city network, 1980.*

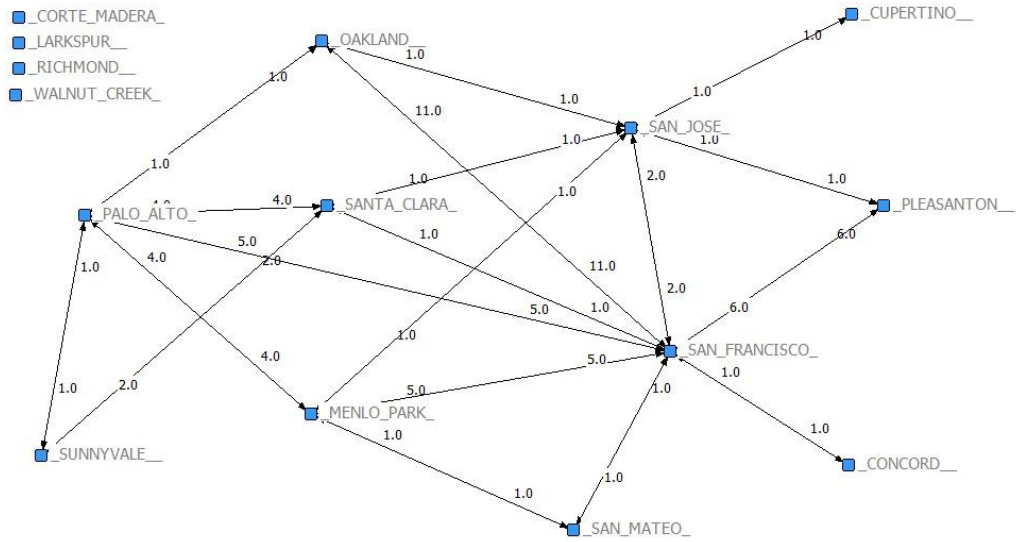


Figure 6c: *LA inter-city network, 1995.*

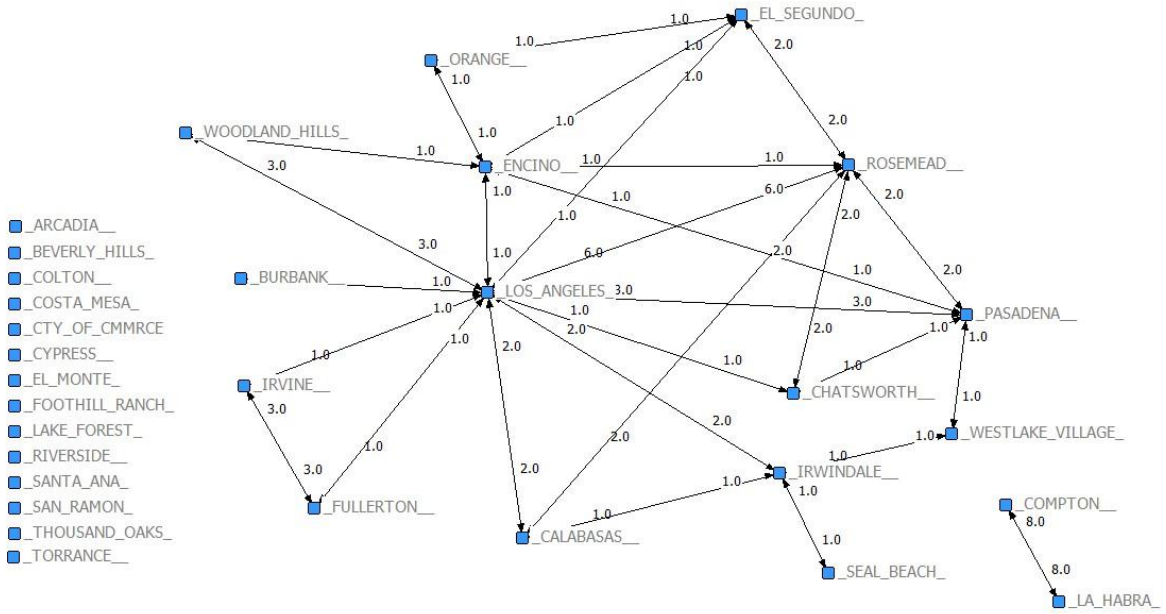


Figure 6d: *Bay Area inter-city network, 1995.*

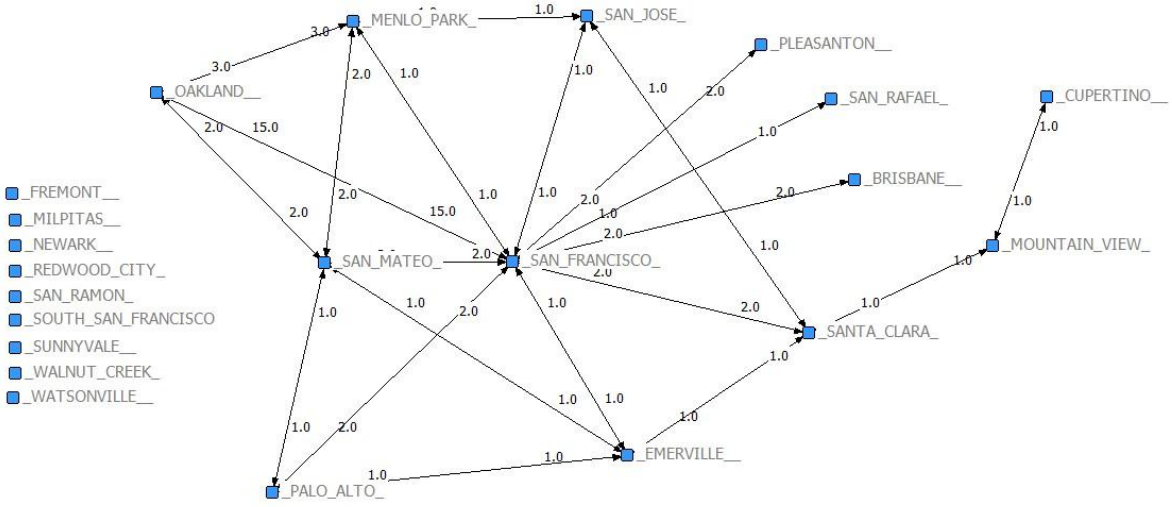


Figure 6e: *LA inter-city network, 2010.*

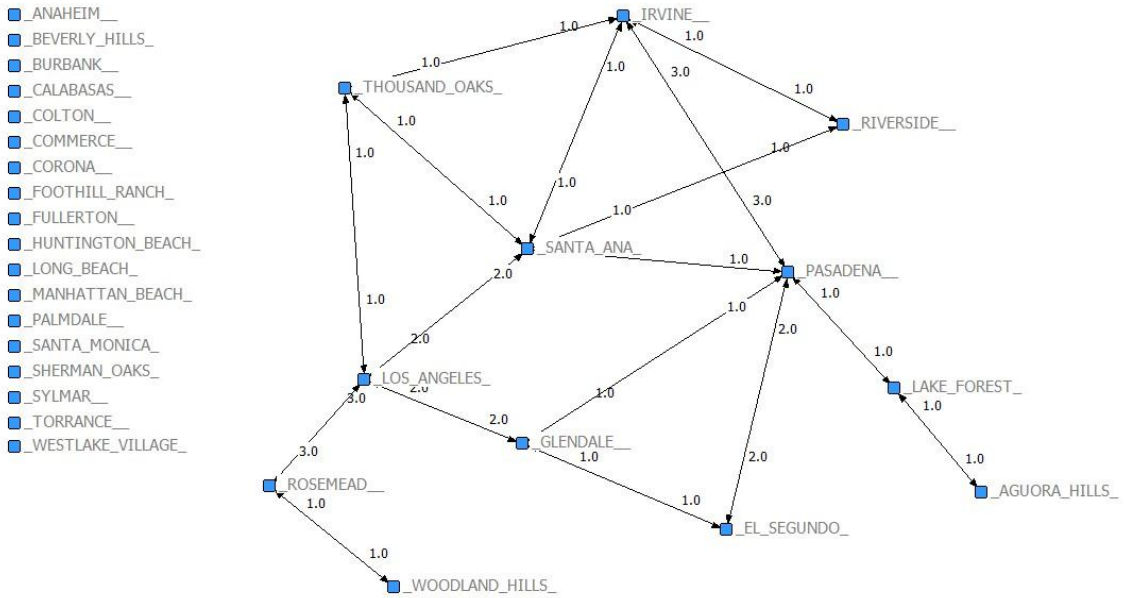
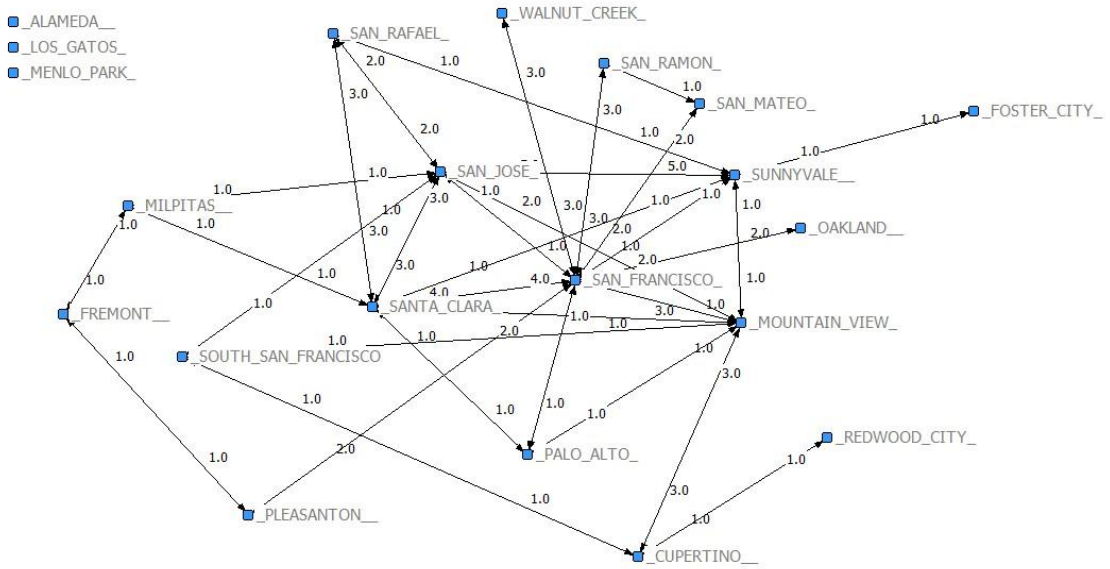


Figure 6f: *Bay Area inter-city network, 2010.*



Source: Author's calculations using UCINET/NetDraw.

Whether the geographic context, changes in industrial composition or other factors drove these changes in LA's corporate structure is not evident from this analysis, but the picture is clear (irrespective of the reasons which make for interesting future research): The Bay Area's high-end corporate social structure maintains a high level of cross-industry and cross-city relations, despite its industrial specialization and corporate concentration, and does so across a broader geographic landscape. The Bay Area's high-end corporate social network is clearly endowed with greater cross-realm relations than LA's over the divergence period. Before investigating the degree to which these high-end corporate networks share widely-held perceptions and belief systems (the other half of the 'coin' of the transposition-enabling socio-relational context under investigation), two addition analyses explore a broader corporate-philanthropic network, and the degree to which business-civic organizations such as chambers of commerce and business councils act as 'anchor tenants' within the corporate-philanthropic social structures in their respective regions.

BROADER CORPORATE-PHILANTHROPIC STRUCTURE

The above analyses have focused exclusively on the high-end corporate structures of each region in 1980, 1995 and 2010. It is common for directors of the largest corporations to sit on the boards of directors of private foundations, which open up the possibility for the latter to fill structural holes in high-end corporate networks. It is therefore conceivable that the socio-relational context of the broader corporate-philanthropic network within which high-end corporate directors are embedded yields different results to the relational analysis conducted above. Therefore, in order to corroborate the findings from the above corporate-level analyses, here the broader corporate-philanthropic networks are analyzed in 1980, 1995 and 2010 (see appendix 4 for sampling sources and methods)..

The broader corporate-philanthropic network was constructed by adding the 50 largest private foundations to the corporate networks in each cross-section. The evolution of this broader corporate-philanthropic network was found to generate results consistent with the above corporate analyses; both regions had similar structures back in 1980, with about half the organizations – firms and private foundations - in both regions' broader networks connected to at least one other organization (recall the figure back in 1980 for the corporate network was 60%, here with double the number of organizations approximately, the percentage is only slightly lower, at 53% and 51% in LA and the Bay Area respectively – see table 26a below). While the SF network maintains its network cohesion over the subsequent 15 years, the LA network by 1995 begins to show signs of fragmentation, as illustrated in Tables 26a and 26b below. By 2010 the LA corporate-civic network continues to fragment, whereas SF's network becomes more connected than in either 1980 or 1995.

Table 26a: *Percentage of organizations connected to at least one other organization in the broader corporate-philanthropic networks in LA and the Bay Area, 1980, 1995 and 2010.*

	LA	**SF**
1980	53%	51%
1995	43%	48%
2010	40%	62%

Source: Author's calculations

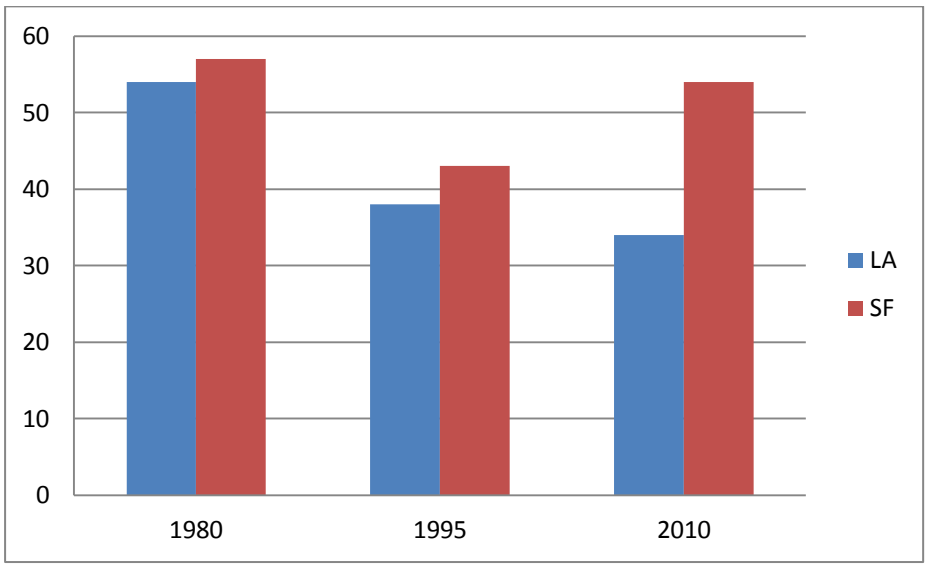
Table 26b: *Number of distinct cross-organization pairs, 1980, 1995 and 2010.*

	LA	**SF**
1980	118	121
1995	74	89
2010	55	86

Source: Author's calculations

The story holds for the size of the largest components (Figure7); both regions' largest components shrink from 1980 to 1995, but while LA continues its downward trend, by 2010 SF reverses this trend and almost re-gains the number of corporations and private foundations in its largest 1980 component.

Figure 7: *Number of organizations in largest component (Corporate-Philanthropic networks), 1980, 1995 and 2010.*



Source: Author's calculations.

Table 27 below reports separately the number of firms and Private Foundations in the combined networks. The number of firms and private foundations added to the combined network, which were otherwise disconnected in the un-combined corporate and private foundation networks, are reported in brackets. So for example in 1980 LA's combined corporate-philanthropic network had a total of 64 organizations connected to another organization, composed of 44 firms and 20 private foundations. The 1980 LA combined network added 2 firms which were otherwise not connected to any firms in the corporate network. The numbers in brackets, which represent the number of otherwise unconnected firms added to the combined network, are all relatively low, therefore private foundations do

not play much of a bridging role in the corporate networks. Moreover, the number of private foundations in the combined networks in all cross-sections is very similar across the two regions, therefore their inclusion in a broader corporate-philanthropic network makes virtually no difference to the results from the above analysis on corporate networks.

Table 27: *Number of connected firms and Private Foundations in combined corporate-philanthropic networks, LA and the Bay Area - 1980, 1995 & 2010:*

Year	LA: # Firms in corp/phil network	SF: # Firms in corp/phil network	LA: # PFs in corp/phil network	SF: # PFs in corp/phil network	Total LA combined	Total SF combined
1980	44 (2)	44 (4)	20	17	64	61
1995	30 (2)	38 (1)	19	17	49	55
2010	30 (4)	52 (2)	16	19	46	71

Source: Author's calculations - The figures in brackets are the difference between the number of firms or private foundation s in the combined networks and the number in the un-combined networks.

Whether the analysis is restricted to the structure of the high-end corporate network or broadened to include high-end private fou8ndatiosn, findings are consistent and tell the same story: The Bay Area and Southern California corporate and corporate-philanthropic networks were very similar back in 1980, and by 2010 the SF networks became more connected, while LA's fragmented over the 30 year period. Adding private foundations to the corporate network does not change the story of fragmentation in LA and connectedness or cohesion in the Bay Area's high-end corporate social structure.

CENTRALITY OF BUSINESS-CIVIC ORGANIZATIONS

All major metropolitan regions have organizations whose principal purpose is to act as convening bodies for the corporate sector and whose primary objectives are to represent the needs and interests of the business and corporate community. It is conceivable therefore that such organizations connect otherwise disconnected corporations in the above networks. Moreover, in light of these organizations' 'raison-d'être', the more central and connected they are within their represented communities, the greater their role as 'conveyors' of widely shared perceptions and belief systems, especially in light of their research arms who disseminate reports and analyses on the state of their regional economies and future prospects. Furthermore, such organizations have the potential to play the role of anchor tenants, which Powell and his colleagues attribute to the process of cross-realm transposition. In addition to the diversity of actors (analogous to the Bay Area's corporate network composed of inter-connected corporations from across diverse industries) which acts as a "rich soup in which practices, strategies and rules can emerge" (Powell et al, 2010-10)., they also emphasize the role of an anchor tenant to a process of cross-realm transposition:

> "A second crucial feature is the presence of an anchor tenant that becomes a scaffolding that, either intentionally or unexpectedly, assists subsequent connections and field formation. The anchor tenant is not disinterested, in the sense of being neutral, but is not directly competitive with the other types of organizations that inhabit the community." (Powell et al, 2010-10).

The analogy of an anchor tenant as described by Powell and his colleagues in the context of industrial genesis is analogous to the potential role of business-civic organizations within their community of corporate leaders. The analysis will thus proceed by measuring the

number of connections as well as the centrality of the five most prominent and representative business-civic organizations in the two regions, within the corporate networks under investigation. The hypothesis of course is that the Bay Area's business-civic organizations are more connected and central within the overall corporate networks in the two regions.

In network analysis the concept of centrality is captured by a measure called 'betweenness centrality', which captures the number of times a node falls on the shortest path between all pairs of nodes in a network.[12] The greater the centrality of a business-civic organization, the more it acts as an important central connecting player in its network. It is helpful to convert this absolute measure into a percentage of all shortest paths, whereby an "nBetweeness," as it is known, of, say, 15% for node A means that node A lies on 15% of all the shortest paths between all node pairs in the network.

The 5 most prominent business-civic organizations in each region were selected by following a two-stage sampling method: In the first stage a snowball strategy was used, whereby academics and practitioners were asked to name the most prominent business-civic organizations in their regions. In the second stage organizations identified in stage one were ranked by their exposure in newspapers, by ranking them by media hits using Nexis-lexis, and selecting the top-5 organizations. Selected organizations for each region are listed and ranked by media hits in table 28 below.

[12] This is known as the measure of "Freeman-Betweenness."

Table 28: *List of top-5 business-civic organizations in LA and the Bay Area:*

Southern California	**Media hits**
Los Angeles Area Chamber of Commerce	>3,000
LA Economic Development Corporations (LAEDC)	>3,000
Valley Industry & Commerce Association	1,491
CALSTART	1,370
Orange County Business Council	1,257

Bay Area	**Media hits**
Bay Area Council/Bay Area Council Economic Institute	>3,000
Semiconductor Industry Association	>3,000
Silicon Valley (Manufacturing) Leadership Group (SVLG)	>3,000
San Francisco Chamber of Commerce	1,792
Jint venture Silicon Valley (JV:SV)	2,033

Source: Author's calculation; media hits computed using Lexis Nexis Academic.

Network analysis of board interlocks between the above corporate-philanthropic networks and the five selected business-civic organizations was conducted for each region in the year 2010. The results, which are presented in table 29 below, reveal the Bay Area Council to be the most central organization in either region, with an nBetweeness of 18% (ie. The Bay Area Council lies on 18% all the shortest paths between all node pairs in the largest component, within which it is embedded). In other words about 1 in 5 of all pairs of organizations (firms and private foundations) must 'pass through' the Bay Area Council in order to communicate through the shortest path. This is three times greater than the LA Chamber of Commerce, the most central organization in Southern California, with an nBetweeness of 5.86%. The remaining BCOs in Southern California have very low centrality scores, with LAEDC lying on fewer than 2% of all the shortest paths between nodes, less

than 1% for the Valley Industry and Commerce Association, and zero centrality for the OC Business Council and CALSTART. In the Bay Area on the other hand, following the Bay Area Council is the Silicon Valley Leadership group (SVLG) which lies on the shortest path of 6% of all organization pairs, the San Francisco Chamber of Commerce with a centrality measure of just below 6%, and the Semi-Conductor Industry Association with 6%. Only the JV:SV in the Bay Area does not lie on the shortest path of any two nodes in the regional corporate-elite network.

Table29: *Degree and betweenness centrality measures of BCOs in the Bay Area and Southern California, 2010.*

Southern California:	**Degree (Links to # orgs)**	**Links to # of PFs**	**Links to # of Firms**	**Links to # BCOs**	**Betweeness centrality**	**nBetweeness centrality**
LA Chamber of Commerce	9	4	2	3	405	**5.86%**
LAEDC	2	0	1	1	117	1.69%
Valley Industry & Commerce Association	2	0	1	1	41	0.59%
OC Business Council	1	0	0	1	0	0.00%
CALSTART	0	0	0	0	0	0.00%
Bay Area:						
Bay Area Council	12	2	**7**	3	1,244	**18.02%**
SVLG	6	0	5	1	415	**6.02%**
San Francisco Chamber of Commerce	3	2	0	1	401	**5.81%**
Semiconductor Ind	5	0	5	0	344	**4.98%**

Assoc						
JVSV	2	1	0	1	0	0%

Source: Author's calculations using UCINET and NetDraw

A closer look at the type of organizations connected to each BCO reveals differences in the relations of each region's sampled BCOs. Almost half of the LA Chambers' connections are to Private Foundations (4 out of 9), 3 to other BCOs (the OC Business Council, the Valley Industry and Commerce Association and LAEDC), and only 2 of the region's sampled largest corporation, Unified Grocers which is not connected to any other firm in the region, and Aecom Technology Corp which is connected to only 2 other firms. The Bay Area Council on the other hand is connected to 12 other organizations, only 2 more than the LA Chamber, but 7 of these board interlocks are with firms in the 2010 sample (over 10% of the region's largest firms). The number and type of relations (to firms, Private Foundations or CBOs) and structural position of each region's 5 sampled CBOs can be discerned visually in Figures 8a and 8b below.

Figure 8a: *2010 Soutehrn California corporate-civic network and BCOs (Note: Color-coded as follows; Firms in Grey, PFs in purple and BCOs in Red).*

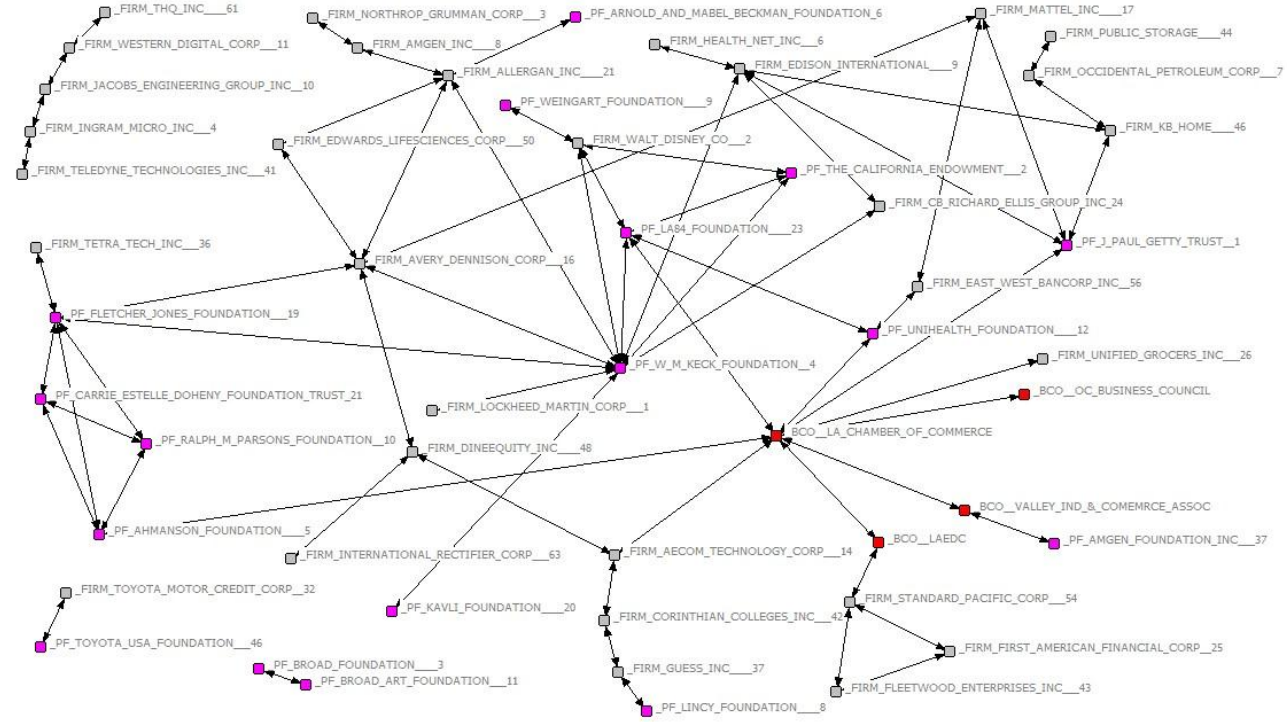
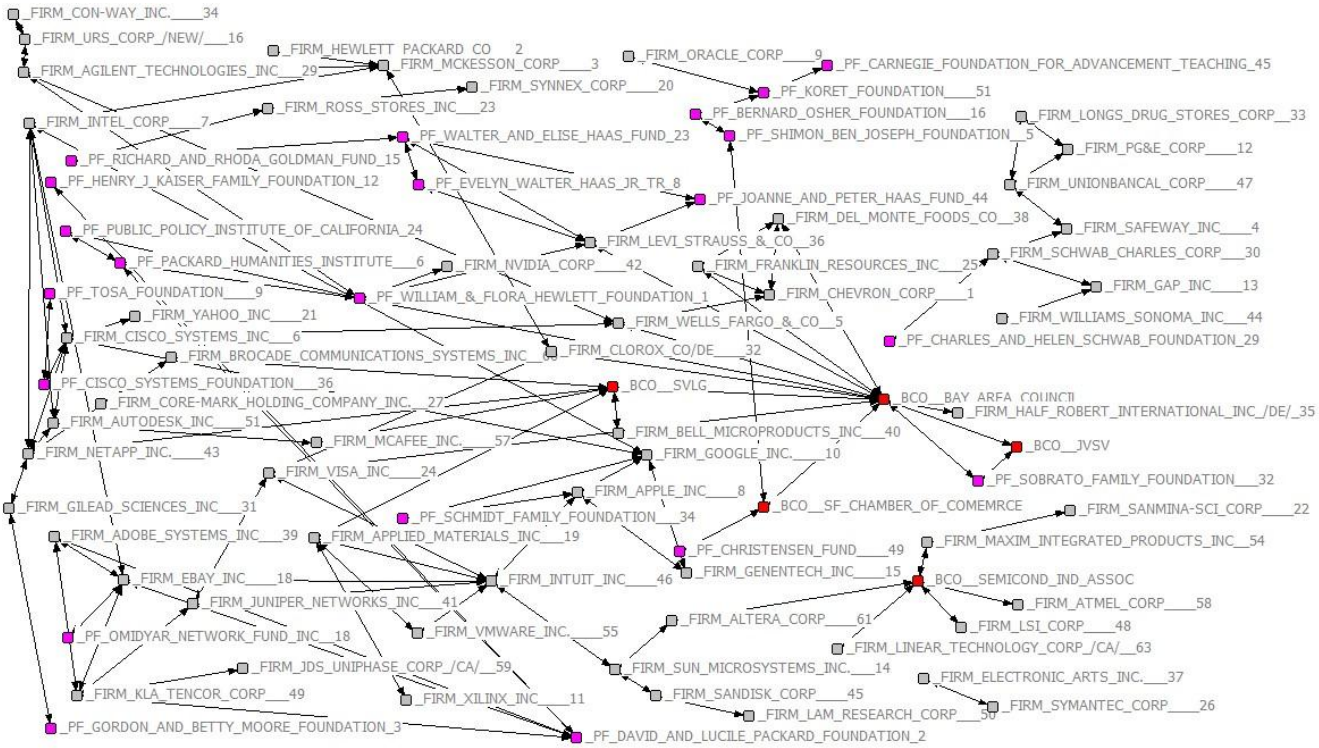


Figure 8b: *2010 Bay Area corporate-civic network and BCOs:*



Source: Author's calculations using UCINET-NETDRAW.

These findings substantiate widely-held beliefs amongst interviewees that the Bay Area Council plays a unique and central role in the region's corporate elite community, with no equivalent organization in Southern California (see appendix 5 for a list of interviewees in both regions and details of interview methods and coding). No other business-civic organization in the Bay Area is regarded as having the clout and regional scope of the Bay Area Council argues Jim Lazarus, the Senior Vice President of Public Policy at the San Francisco Chamber of Commerce:

> "…they are really the only regional organization we have, and though they are made up of, you know, the two or three hundred largest employers in the Bay Area they are not a chamber type, you know, all these chambers are funded predominantly by whatever big business you have but they are filled with small business members. We have almost 2,000 members but the vast majority of them are, you know, have less than 15 employees. That's not the case with the Bay Area council. So, but we look to that and the Bay Area council plays a role in trying to bring the various regional Bay – localized business groups together on regional issues. So, to that degree we are fortunate we have [the Bay Area Council] because we don't have a greater San Francisco Bay Area chamber" (Interview with Jim Lazarus, 2010).

Max Neiman, the Associate Director and Senior Fellow at the Public Policy Institute of California, believes that the Bay Area Council plays a critical role in the region's cohesiveness:

> "So, there is a cohesiveness up here politically and institutionally that doesn't exist in Southern California. Southern California is much more decentralized politically. You

don't have anything like really the Bay Area Council in Southern California, you know" (Interview with Max Neiman, 2010).

Mark Pisano, the former Executive Director of SCAG contrasted the LA Chamber of Commerce with the Bay Area Council:

> ""When I first came here I went to the LA Chamber, which at that point in time was a five county chamber and said let's have a public and private coordination and the LA chamber said we don't need the public sector and we really don't want to venture with you. You had a different attitude between the Bay area council, which existed at that time and their regional organizations… And I think to this date we still don't have the [equivalent of the] Bay area council down here" (Interview with Mark Pisano, 2010).

Michael Woo, former elected member on the Los Angeles City Council between 1985 and 1993, also contrasts the LA Chamber with the Bay Area Council:

> "…the Bay Area Council which is a regional organization of businesses is more influential I think than I guess the top of the bottom here is the Los Angeles Area Chamber of Commerce which – it was not a very powerful regional organization… I think historically at least going back over three decades [the Bay Area Council] have been more influential than any business organization here… I think that the LA Area Chamber of Commerce is largely a reactive organization… my hunch is that the Bay Area Council is more proactive, that it initiates things whereas the LA Area Chamber of Commerce I think is a weaker organization which doesn't have the power to initiate things and tries to stop things it doesn't like" (Interview with Michael Woo, 2010).

A highly influential member of LA's business elite community who sits on the boards of two of our 1995 and 2010 sampled firms contrasts the San Francisco Chamber of Commerce to the LA Chamber:

> ""[T]he SF Chamber of Commerce is definitely more effective. I joined and dropped [the LA Chamber] after one year. It is not addressing or going anywhere on issues. Too many people with different issues" (Interview with anonymous LA business elite, 2010)

The above network analysis confirms these widely-held beliefs about the unique structural position held by the Bay Area Council, and adds an additional dimension of cross-realm relations, through centrally positioned business-civic organizations, to the Bay Area's high-end corporate social structure, which previous analysis has already shown to have a great deal more cross-realm relations (cross-industry and cross-city) than LA's networks over the 30 year divergence period.

SUMMARY: CROSS-REALM RELATIONS ACROSS CORPORATE STRUCTURES

The objective of the above analyses was to contribute to the evidence in the literature about the Bay Area's transposition-enabling socio-relational context, which is widely recognized to have played a catalytic role in the evolution of its industrial structure over the past three decades. Cross-realm relations were found to be a critical relational characteristic behind high-end entrepreneurship and industrial genesis. Recent research studies have identified cross-realm relations as a key characteristic of highly-successful biotechnology clusters in the Bay Area, Boston and San Diego, and in regional high-end entrepreneurship, combining the 'right' people, firms and institutions together to absorb, develop and commercialize new knowledge as it evolves.

The above study was designed to investigate whether cross-realm relations were evident across the high-end corporate social structure of the Bay Area. The hypothesis behind this study was that the Bay Area's transposition-enabling socio-relational structure was evident at the scope of the regional high-end corporate social structure, and moreover that it was absent in Southern California. This piece of 'relational' evidence will be combined with evidence on widely held perceptions and belief systems in the subsequent section, to gauge whether a transposition-enabling socio-relational context was evident at the scope of the region's high-end corporate social structure.

SHARED TRANSPOSITION-ENABLING CONVENTIONS

The purpose behind the studies in this part of the overall research (Part II) is to gauge the scope of the transposition-enabling socio-relational context in the Bay Area, in contrast to its hypothesized absence in Southern California. This and the previous section investigate two aspects of the transposition-enabling socio-relational context at the scope of the high-end corporate social structure over the 1980 to 2010 divergence period: The relational context (examined in the previous section), and shared conventions in this section. The relational context is deemed to be transposition-enabling if it is characterized by cross-realm relations, (possibly brokered by central anchor tenants), and widely-shared perceptions and belief systems.

It is helpful at this stage to re-cap the rationale behind choosing widely-shared perceptions and belief systems as the transposition-enabling dimension to complement cross-realm relations. Initially the research began by defining a transposition-enabling socio-relational context as composed of two inseparable dimensions of the same coin (Owen-Smith and Powell, 2008): Networks and conventions. Cross-realm relations from the literature were

evidently the transposition-enabling aspect of networks; transposition enabling conventions was a trickier concept to define, due to the lack of theoretical guidance. For instance in Woody Powell and his colleagues' research on the genesis of the biotechnology industry (Powell et al, 2010), anchor tenants were found to help "institutionalize a community of like-minded participants… As a consequence, the norms that characterized inter-organizational relations in the three clusters bear the signatures of the anchor tenants" (Powell et al, 2010-p. 31 and 40). Thus the conventions across the three realms essentially fused – which is what happens when people from across realms learn to work together (Padgett, 2005-p. 40). Relational density within a context of geographic proximity they argued "generated shared expectations. Local norms for collaboration and knowledge exchange developed" (Powell et al, 2010-p. 41). Therefore the emphasis is placed on post-transposition conventions, but little is said about the role of cross-realm conventions prior to transposition, and whether conventions are more or less likely to transpose or conflict and why.

Yet despite a lack of theoretical guidance about the nature or aspects of conventions that determine their propensity for transposition, transposition of actors' distinct conventions is at the crux of their theory on industrial genesis through a process they call cross-network alignment "such that ideas and models are transposed from one domain to another" (Powell et al, 2010-p. 12). Rather than theorizing about specific *transposition-enabling conventions* or 'bundles of conventions', the authors emphasize the *transposition* of conventions, so that actors with different conventions develop new hybrid conventions from the distinct conventions they bring from their distinct communities (Padgett and Powell, 2012). Moreover, prior to transposition, conventions by definition are distinct, and no theory is given about aspects of conventions that are more or less-likely to transpose.

Annalee Saxenian, in her seminal comparative study of Silicon Valley and Route 128, highlights several aspects of Silicon Valley's culture which she attributes to their success. Saxenian emphasises "the shared understandings and practices that unify a community and define everything from labor market behaviour to attitudes toward risk-taking" (Saxenian, 1996-p. 7), such as "tolerance of failure" (Saxenian, 1996-p.112), a "culture of change" (Saxenian, 1996-p. 38), openness to "risk-taking and experimentation" (Saxenian, 1996-p. 31) and "collaborative relationships among small firms" (Saxenian,1996-p. 12). Saxenian thus also presents anecdotal evidence and observations about specific aspects of widely shared conventions that are conducive to collaboration between diverse people, firms and institutions within a highly competitive innovation-driven regional economy, but again these are not amount to a theory about cross-realm conventions and their propensities to transpose.

Cognitive psychology offers some theoretical insights which helped guide the research on conventions in this study, or more precisely, the belief systems that structure conventions. Recall that the purpose of this and the previous section is to identify the scope of a transposition-enabling socio-relational context in the Bay Area, and a lack-thereof in Southern California. In the absence of theoretical guidance on the characteristics of transposition-enabling cross-realm conventions, it is helpful to turn to new institutional economics which draws heavily from cognitive psychology in defining and theorizing about the role of ideology or perceptions and belief systems in institutional evolution, which 'sit behind' the informal institutions of conventions (North, 1990; Denzau and North, 1994; North, 2006).

Ideology is defined by Douglass North and Arthur Denzau as "the shared framework of mental models that groups of individuals possess that provide both an interpretation of the environment and a prescription as to how that environment should be structured" (Denzau

and North, 1994vii-p.24). The authors thus conceive of ideology as a common 'cognitive strand' that runs through diverse mental models across distinct communities. Ideologies or belief systems can either be widely-held, reflecting a cross-community consensus of beliefs and interpretations or perceptions of reality, or they can be widely disparate in which case they reflect divisions in perceptions within society (North, 2005-p. 6). It follows that divisions in society discourage cross-realm transposition, and that widely-shared belief systems enable cross-realm transposition.

North in fact goes as far as to argue that "[t]he dominant beliefs, that is, of those political and economic entrepreneurs in a position to make policies, over time result in the accretion of an elaborate structure of institutions, both formal rules and informal norms, that together determine economic and political performance" (North, 2003-p. 6). In other words widely-shared belief systems result in the accretion of informal norms (conventions) which if widely shared facilitate cross-realm communication and learning (Denzau and North, 1994-p. 4). As cross-realm transposition gives rise to new institutions (from organizations to industrial clusters) with new hybrid conventions, it follows that widely-shared belief systems across realms enable transposition.

In the absence of guiding theoretical insights about transposition-enabling conventions, the research on the social-dimension of the above high-end corporate leadership draws from new institutional economics to focus on the following two aspects of belief systems, which according to the above-reviewed theory shapes conventions and their propensity to transpose: Perceptions about the rapidly changing economic environment and the role of the regional economy within a new global economic context (which shape conventions); and the degree to which they are widely shared (which impacts the propensity for cross-realm transposition) .

The premise behind this research, following Douglass North and Arthur Denzau, is that widely held and appropriate interpretations of the rapidly changing economic context and the role of their regional economies within this changing reality will determine the extent to which actors from across diverse industrial communities can communicate, see eye to eye, and collectively re-interpret their socio-relational context. As North and Denzau argues, when "different individuals have similar models they are able to better communicate and share their learning" (Denzau and North, 2007-p. 4). Such widely shared belief systems thus act as a 'bridge' across diverse communities, each with their own conventions. Such 'cognitive bridging' can thus enable diverse actors with distinct conventions to communicate, understand each other' perspectives, find common ground, and in some cases transpose their conventions into new conventions embedded in new cross-realm relations, in response to new collective uncertainties from a rapidly changing environment. Whether such transposition yields the desired results, according to North and Denzau, is determined by the appropriateness of the over-arching belief systems about the changing reality.

The research in this section thus builds on the relational study in the previous section by analyzing how the corporate and political leadership of the two regions perceived the rapidly changing economic reality and the role of their regions within this changing economic environment, and the degree to which their belief systems were widely held and consistent over the 1980 to 2010 divergence period. The hypothesis behind this analysis is that the Bay Area's high-end corporate society (the scope of analysis in this and the previous section) developed an appropriate, widely-shared and time-consistent interpretive model of the rapidly changing economic environment between 1980 and 2010. As discussed above in light of new institutional theory, such a widely-held belief system can facilitate cross-realm relations (by facilitating communication), and their appropriate interpretation of the changing economic

context allows for a more appropriate socio-relational response to the emerging economic challenges and opportunities. It follows that cross-realm transposition is more likely to emerge in a socio-relational context characterized by a 'thick soup' of cross-realm relations and widely-held belief systems that facilitate cross-realm communication. Moreover, if widely-held belief systems offer actors an appropriate interpretation of a changing economic reality, their socio-relational re-organization in response to change, which in some cases leads to cross-realm transposition, will be more likely to successfully overcome uncertainty and improve competitive positions within the rapidly changing economic environment.

We know from previous research that the Bay Area has clearly developed widely-shared conventions which enable people, firms and institutions from distinct communities, each with their distinct conventions, to develop new relations and transposed conventions for absorbing, developing and commercializing new knowledge. The investigation in this Part II of the research is to gauge the scope of the transposition-enabling socio-relational context in the Bay Area, and moreover to show that such a context is absent in Southern California, which a) would substantiate the hypothesis about the role of a transposition-enabling socio-relational context in industrial development at the technological frontier and consequently regional per capita incomes; and b) would substantiate the claim that what has been measured as a transposition-enabling socio-relational context is indeed what it is claimed to be, as its absence in Southern California would add credence to this claim.

In order to gauge how the corporate community perceived the rapidly changing economic environment throughout the divergence period, archival research was conducted on reports published between 1980 and 2010 by business-civic organizations. In addition to business-civic organizations, reports by the two regions' Councils of Governments (COGs) were also analyzed. A business-civic organization's primary purpose is to represent the

interests and needs of the region's business and corporate community. Many publish reports about the state of the regional economy. It follows that the belief systems in these reports reflect to a great extent the belief systems of the corporate community whom they represent. Archival research of reports published by business-civic organizations will thus act as a proxy for the belief systems of the high-end corporate society whose networks were analyzed in the previous section.

In light of the interdependence between the corporate sector and the broader regional economy and society (due to the contributions by the largest corporations to regional employment and public tax revenues amongst other benefits), the political leadership is expected to also reflect the interests of the corporate community, especially with relation to the regional economy. Therefore in addition to reports by leading business-civic organizations, reports by the two regions' COGs were also included in the analysis, as an additional channel into the perceptions and belief systems of the high-end corporate leadership (For a full list of reports by organization please see Appendix 7).

Archival research involved extracting information reflecting perceptions and belief systems about the economic environment and the regional economy expressed in reports, articles and pamphlets published between 1980 and 2010. Perceptions and belief systems were contrasted across the two regions decade by decade, and their consistency over time was also evaluated within each region.

CONTRASTING BELIEF SYSTEMS

SCAG and ABAG, over the past three decades, have focused on urban planning issues around infrastructure and housing. As far back as the mid-1980s, ABAG recognized the region's "[l]ocational advantages, outstanding educational facilities, [and] a labor force

market skilled in the occupations of the future" (Association of Bay Area Governments, 1985: 29). Its few references to the regional economy have been in the context of safeguarding the region's economic competitiveness by easing housing costs and congestion. A typical statement over the period, is this one: "[i]nsufficient housing production and transportation capacity could alter the competitive position of the region" (Association of Bay Area Governments, 1985: 29). Other leading regional business-civic organizations in the Bay Area focus more on the regional economy; thus a consistent focus over time on the knowledge economy was found in 36 Joint Venture Silicon Valley (JV:SV) reports published since its creation in 1993, with a further emphasis on the resilience of the regional economy, and the capacity of the region to collaborate in response to its challenges. Joint Venture's vision is "to build a community collaborating to compete globally" (Joint Venture Silicon Valley, 1998).

The Bay Area leadership has framed globalization as more of an opportunity than a threat. This view was captured by the Bay Area Economic institute in 1995, at a time when the US and California were generally becoming more fearful about global offshoring of production:

> "…most early-stage, low-volume and high-end production is likely to remain in advanced economies, so long as their research and innovation capabilities are differentiated and superior. Similarly, production of goods that involves sensitive intellectual property, or that requires a high level of adaptability to respond to fast-changing demand and customer service needs, will be located close to local markets, often in higher-cost locations such as California. Thus, the global manufacturing footprint of the future, even for a single company, likely will involve a mix of

locations, with "basic," high-volume production offshore and "customized" production maintained domestically" (Bay Area Economic Forum, 2005).

A similarly picture emerges from Bay Area Council Economic Institute reports; of 55 reports published since 1999, 33 refer to the Bay Area knowledge economy, innovation and/or productivity in their titles.[13] Examples of such titles include: "The Bay Area: Winning in the New Global Economy" (Bay Area Forum, 1999), "The innovation economy: protecting the talent edge" (Bay Area Forum, 2006), "Bay Area Innovation Network Roundtable: Identifying Emerging Patterns of the Next Wave of Innovation" (Bay Area Economic Institute, 2007) and "Innovation and Investment: Building Tomorrow's Economy in the Bay Area" (Bay Area Economic Institute, 2012) are just a few examples. Throughout these reports, one finds concern with human capital and technology clusters, productivity growth, shareholder return growth, growth of private companies, the Bay Area venture capital industry, the number of Fortune 500 corporate headquarters in the region, the presence of world-class academic and research facilities, measures of regional innovation, and resilience in the face of economic shocks (Bay Area Forum, 1999, 2006 and 2012).

In 2012, the Bay Area Council Economic Institute sums up the perspective they held throughout this period:

> "The region's ability to conceive, research, develop and commercialize new technologies and business models is based on an interconnected innovation system composed of a diverse set of institutions and actors that are linked by networks and share distinct cultural perspectives on how value is created. Together, these components and processes constitute an innovation value chain that—because

[13] See appendix 7 for a list of Bay Area Council Economic Institute reports analyzed.

innovation is dynamic and often non-linear—can also be described as an innovation cloud. This system has proven resilient, reinventing and repurposing itself through multiple crises and economic cycles" (Bay Area Economic institute, 2012: 1).

Thus, since the early 1980s and especially the 1990s, the Bay area's corporate leadership consistently perceived the regional economy as a new knowledge economy, as a central node in the new global economy, and their understanding of the knowledge economy has been highly sophisticated, in-depth and multifaceted, emphasizing the relational infrastructure behind its innovative capacities.

Southern California leaders have had conflicting perceptions of the regional economy, and more fragmented world views, like the Southern California economy itself. Most importantly, they have vacillated on whether to pursue a high-wage high-skill economy as a regional goal. In the early 1980s Southern California, with a much bigger manufacturing sector than the Bay Area, began experiencing a steady erosion in manufacturing employment. Major capital-intensive assembly and branch-plants began to close down in the region, with consequent employment losses. Deindustrialization was driven by a combination of factors, including the consolidation and relocation of operations due to a fall in domestic transportation costs, Japanese competition in the auto industry, and the beginning of large-scale off-shoring due to globalization. As Mark Pisano the executive director of SCAG between 1976 and 2007 (Southern California Association of Governments, 2007) pointed out, the Southern California region "lost about 12% of [its] employment base and the Bay area's losses were not anywhere near the reductions that we experienced" (Pisano, 2009).

To its credit, SCAG recognized the rise of the new knowledge economy as far back as the early 1980s, attributing the economic downturn in manufacturing to:

> "[t]he rise of the knowledge economy… Understanding the character of these transformations may lead to innovative regional policy formulation as regards industrial change (such as policies for research and development, investment patterns, education and retraining programs for the labor force in the region)" (Southern California Association of Governments, 1984-p. 11).

But SCAG has also been characterized by more traditional ways of thinking that see the economy as a collection of factor supplies. Thus, SCAG argued that gains in labor productivity were the primary driver of the region's economic growth since the beginning of the 20th century, accounting for two-thirds of regional growth. Increased labor productivity:

> "…can be attributed to the upgrading of the skill-levels of the workforce. Investment in human-capital, thus, has become as important as investment in capital equipment in explaining both the present economic structure and the prospects for growth in the regional economy" (SCAG, 1984: 9).

SCAG thus perceived "[m]atching labor-supply and qualifications with employment demand" to be a one of the "key economic issues emerging from the on-going transition currently taking place" (SCAG, 1984: 16).

The early 1990s brought a recession to the US economy. The downturn was more severe in Southern California than in the country as a whole because it coincided with the structural transformation of the aerospace industry, resulting in its downsizing in Southern California. In part as a result of that recession, the real estate sector in Southern California, already hit by the end of a national real estate cycle in 1989, suffered bigger and longer declines in value than in Northern California, further depressing the regional economy. The woes of the region were intensified by social strife as well. In 1992, Rodney King was

photographed while being beaten by Los Angeles police, and the acquittal of the policemen led to a major civil disturbance in the city, which spread beyond "ghetto" areas, causing major property damage and loss of life. In this atmosphere of crisis, SCAG turned its full attention to the regional economy.

SCAG published its first regional comprehensive plan (RCP) in 1993, identifying the goal of raising regional per capita income. SCAG went as far as to explicitly declare that: "[t]he fundamental economic goal of regional planning must be to improve the welfare or standard of living of those who work and reside there... the objective measure that comes nearest is real personal income" (SCAG, 1993: 2.4). Therefore "[i]ncome targets for 2010 should be expressed in terms of growth rates of real income between 1990 and 2010" (SCAG, 1993: 2.4). To achieve improvement in income growth, SCAG called for ambitious cluster-based economic development strategies and initiatives focused on several sectors in which the region was deemed to enjoy existing strengths and future growth potential. These included apparel, entertainment, tourism, environmental technology, aerospace and defense, foreign trade services, advanced transport systems and technologies including environmental technologies, and the biomedical equipment industry. This new focus on personal income and cluster-based approaches to development were shared by the Los Angeles Economic Roundtable:

> "An industrial development strategy could help salvage aerospace's capital investment and the economic productivity of its skilled workforce by improving prospects for retaining current industries. It could also help spark a new, dynamic growth trajectory for the region's economy" (Los Angeles Economic Roundtable, 1992: IX).

In the 1990s, in response to the shock of the Rodney King riots and to growing poverty and low-income population, an ad hoc organization known as Rebuild LA was formed at the behest of the Los Angeles mayor's office, and endorsed by the LA City Council. Its board of directors was composed of the major civic and corporate leaders of Southern California, who pledged substantial financial contributions to support its research and implementation activities. Rebuild LA stressed the development of industrial clusters, similar to the SCAG strategy of the same period. Both Rebuild LA and SCAG also emphasized the importance of addressing the needs of the most economically-vulnerable populations:

> "[p]ublic, private and non-profit organizations must understand and flexibly respond to different communities and to the varying needs of their residents. To develop inter-group harmony, existing organizations must work to build dialogue at the community level and create forums where local issues may be addressed" (SCAG, 1993: 7.2).

By the new millennium, however, discourse of the Southern California region as a knowledge economy with a focus on raising per-capita incomes had all but faded from SCAG reports, crowded out by the new dominant view of Southern California as the US gateway to international trade, with attention on its ports, warehousing complex, freight infrastructure and low-skilled low-waged light manufacturing (Erie, 2004). From the numerous clusters identified in SCAG's 1993 RCP, foreign trade services was the only one to retain leadership attention after 2000. Rebuild LA had folded by 1994, a mere two years after inception, and was widely considered to be a failure. The private corporate leaders of the region failed to deliver on their pledged support, and the LA city government lost interest. As Professor Kevin Starr stated in 2004 in an interview with the Financial Times "the great and good of Los Angeles strove and failed to engineer the recovery through a many-headed 'rebuild LA'

commission" (Parkes, 2004: 13). Peter Ueberroth who co-chaired the commission quit "in frustration when corporations were too slow to commit to jobs in inner-city neighborhoods" (Kasindorf, 2003: 3A)

SCAG then turned its attention to light manufacturing, with Los Angeles County as its perceived geographic growth engine. To support this low-wage sector, SCAG's 2001 State of the Region report stressed the need to reduce business costs. It argued that Los Angeles County's economic diversity must be revived "by unlocking political barriers to redevelopment of its underutilized land" (SCAG, 2001: 33). Los Angeles should thus be more welcoming to "[m]iddle and working class manufacturing or wholesale sectors which do not enjoy political support in Los Angeles." Such support would reduce their relocation "to places like Riverside-San Bernardino or Eastern Orange counties" (SCAG, 2001: 29). In essence, then, Los Angeles County was encouraged to compete directly with low-wage, low-land cost interior regions, rather than to differentiate itself from them on the basis of skills, knowledge and specialization.

SCAG's perspective was supported by the City of Los Angeles, explains Michael Woo, member of LA's city council from 1985 to 1993:

> "…(i)n response to the exodus of industrial jobs out of Los Angeles and specifically out of Downtown Los Angeles, the mayor called for changes in land use to discourage or prohibit the conversion of industrially zoned land to residential or other nonindustrial uses. This was part of Mayor Villagaroisa's industrial jobs strategy" (Interview with Michael Woo, 2011).

Woo explains that he voted against restricting the conversion of industrial land to other uses, because

> "[a]s a planning commissioner even though I am sympathetic to the role of maintaining industrial jobs I thought that very little of this had to do with zoning, that there are other factors such as wage levels which had a lot more to do with where industrial jobs are located than the zoning of downtown property" (Interview with Michael Woo, 2011[14]).

SCAG's continued emphasis on manufacturing was echoed by the Los Angeles Economic Development Corporation/Kayser Center for Economic Research, in their 2011 report entitled Manufacturing: Still a Force in Southern California: "if we want to attract manufacturing firms to the region, we need to have sufficient industrial land available and for neighbors bordering industrial zones to understand the importance of manufacturing to the local economy" (Los Angeles Economic Development Department and Kayser Center for Economic research, 2011). In other words, at a time when the share of manufacturing in the US and every other advanced economy was declining rapidly, metropolitan Los Angeles' leadership emphasized retaining it, in the form of light manufacturing (which is the lowest-wage component of the overall manufacturing sector), even though metropolitan Los Angeles is a high-wage and high land-cost region even within the US, not to mention at a world scale.

At the same time, the logistics industry had also become a central priority of Southern California leaders. As Hassan Ikhrata, SCAG's executive director since 2008 put it, "just after the aerospace [decline], the logistics industry became a major contributor to economic activity; the ports, airports, warehousing etcetera. So the region adjusted pretty well in kind of reinventing itself with industries." Unfortunately, notes Ikhrata, "the logistics industry is

[14] Michael Woo was expressing his thoughts about Villagarosa's industrial strategy in the mid-2000s, "as a planning commissioner", referring to his position between 1985 and 1993.

not the industry that creates [high paying] jobs. The high paying jobs are not here" (Ikhrata, 2011).

SCAG's explanation for the region's decline in per capita income was not the structural changes occurring in the world economy and their effect on the locational patterns of industries, but rather regional supply-side factors, and notably the low level of skills and education in the region. The 1980s and 1990s were the peak of Latin American immigration to Southern California. At the same time, the economic downturn of the 1990s contributed to domestic outmigration. "While 81 percent of the domestic out migrants completed at least a high school education, only 46 percent of the recent immigrants were able to achieve the same" (SCAG, 2002: 3). This demographic shift argued SCAG was driven by "an unprecedented large flow of net domestic outmigration due to the recession and the sustaining flow of foreign immigration" (SCAG, 2002: 3). These forces, according to Ikhrata, are driven by market forces and are beyond the control of government intervention: "Look, this is a market economy. No entity, not private or public, could ever dream that they themselves can sort this. So I think the market adjusted itself [to the aerospace decline] more than anything else" (Ikhrata, 2011).

In other words, after a brief moment of considering a possible high-wage, new economic future for Southern California, regional leaders reverted to emphasizing reviving manufacturing and building a bigger logistics complex. The industrial policy and labor market reports by the Economic Roundtable exemplify this shift. Of thirty-two reports, eight were published in the 1990s and twenty-three in the 2000s (see Appendix 7). Six of the eight reports published in the 1990s were focused on defense conversion to high-wage commercially-focused industries or other knowledge-based industrial clusters in the region.

In the 2000s attention had turned to issues around homelessness, poverty, unemployment, affordable housing, inequality and the environment, with only 3 of the 23 reports analyzed focusing on high-waged cluster development such as green-tech and tourism. Accompanying this shift in focus, Southern California's political and corporate leadership continued to call for a reduction in regulation. SCAG perceived the need for the region to "…more clearly and explicitly prioritize the importance of development in the context of other competing agendas, and clarify the circumstances in which economic consideration outweighs other concerns" (SCAG, 2001: 16-17). This world view is echoed in the 2011 Los Angeles Economic Development Commission report on manufacturing, which blames regional business costs rather than the region's skills, knowledge, social infrastructure and other systemic factors, for its problems.

> "The State of California has comparatively high utility costs, strict air quality standards and AB 32 (California Global Warming Solutions Act) is coming. California and Los Angeles both have a difficult regulatory climate, which increases the cost of doing business here" (Los Angeles Economic Development Corporation and Kayser Center for Economic Research, 2011: 30).

Whereas environmental regulations in the 1990s were perceived as an opportunity for the SCAG region, with the potential to grow a high-wage environmental technology sector, by the 2000s, California's environmentalism was again cast as an obstacle to economic growth:

> "Companies are leaving Southern California, California in general, because I think it's a well known fact that companies, big corporations, have to contend with more regulation than say Texas. I'm not saying that is all that bad, to a certain limit

California is attractive because it's trying to do the right thing and it's progressive, but on the other hand if you're a company with 100 employees and you're gonna pay a 'zillion' dollars just to get started, and it's cheaper somewhere else you go somewhere else" (Ikhrata, 2011).

Since the 1980s, Bay Area elites have consistently perceived their regional economy as a new knowledge economy, stressing technology, innovation and skills. No matter what the central purpose of the reports analyzed, from economic recovery to housing, transportation and the environment, the Bay Area leadership consistently perceived theirs as a knowledge economy. The Bay Area leadership narrative exhibits a nuanced and multi-faceted understanding of the new economy, including human capital and industrial clusters, as well as socio- institutional and relational networks, seen as keys to innovation and resilience.

Southern California leadership on the other hand aspired to a high-wage knowledge-intensive Southern California economy only briefly in the early 1990s. By the new millennium, these concerns were crowded out by a concern with absorbing a low-waged low-skilled workforce. Attention turned to attaining advantage in much more traditional ways, notably augmenting economies of scale in the ports and the logistics complex, and to reviving manufacturing by attracting businesses and reducing costs and regulation. In essence, Southern California never developed a coherent and sustained focus on being part of the new economy.

SUMAMRY: WIDELY-SHARED PERCEPTIONS AND BELIEF SYSTEMS

Archival research of publications by political and business-civic organizations shows a clear difference between the perceptions and belief systems of the corporate-political leaderships of the two regions over the 1980 to 2010 divergence period. The Bay Area

leadership's perceptions and belief systems follow a consistent ideological trajectory over the period, developing a sophisticated interpretation of the economic challenges brought about by global economic changes over the period, emphasising the productivity and competitiveness of its regional economy, and the socio-relational context under-pinning its innovative capacity and resilience in the face of shocks. The Bay Area's corporate and political leadership on the other hand changed its perceptions and belief systems over the period, from a focus on human capital development in the 1980s, to cluster development and an emphasis on high-waged economic development in the 1990s, to a drastic switch to perceiving the region as an global hub for international trade and logistics and a renewed focus on light manufacturing. The two regions also perceived globalization and environmental regulations in different lights: The Bay Area considered both more as an opportunity while Southern California's leadership perceived these as a threat.

The consistency over time in the Bay Area's leadership perceptions can be interpreted as a reflection of a widely-shared consensus about the economic environment and the role of the region within it. The oscillation of Southern California's leadership perceptions on the other hand can be interpreted as a lack of time-consistent consensus. The evidence from this research study points to widely-held belief systems amongst the Bay Area's high-end corporate leaders, reflecting a cross-industry consensus of beliefs, and widely disparate beliefs in Southern California, which reflect divisions in perceptions within the Southland's high-end corporate leadership.

The findings in this and the previous section together paint a picture of a transposition-enabling socio-relational context at the scope of the high-end corporate social structure in the Bay Area, characterized by a high degree of cross-realm relations enabled by a very central business-civic organization (the Bay Area Council), and widely-shared and

contextually appropriate belief systems about the rapidly changing global economic climate and the role of the Bay Area economy within it. The findings also point to the absence of such a transposition-enabling socio-relational context at the scope of Southern California's high-end corporate social structure, evident by its relational fragmentation and drastic decline in cross-realm relations over the 1980 to 2010 period, and moreover widely disparate beliefs and perceptions about the changing economic environment and the role of the Southern California economy within it. Moreover, in light of the region's structural position as a high-cost region with highly innovative and promising industries in the 'new economy' such as entertainment and high-tech aerospace, the corporate leadership's perceptions and beliefs have been arguably inappropriately focused on the low-road dimension of its economy. Such a perspective generates a fearful perception of globalization and environmental regulation, with an emphasis on regulation and tax-reduction for attracting companies to the region rather than competitiveness through innovation and high-end entrepreneurship.

How exactly network fragmentation and beliefs co-evolve is beyond the scope of this chapter, but raises interesting questions about the impact of divergent beliefs on cross-realm relations, and vice-versa. As North and Denzau argue, when "different individuals have similar models they are able to better communicate and share their learning" (Denzau and North, 2007-p. 4). The social fragmentation of Southern California's high-end corporate social structure, characterized by un-bridged structural holes across industrial and geographic boundaries, might be due to widely-disparate belief systems. On the other hand, Denzau and North also argue that "no two individuals have exactly the same experiences and accordingly each individual has to some degree unique perceptions of the world. Their mental models would tend to diverge for this reason if there were not on-going communication with other individuals with a similar cultural background" (Denzau and North, 2007-p. 12-15).

Disparate beliefs in Southern California's high-end corporate society might alternatively be due to the lack of contact (i.e. lack of cross-realm relations) between disparate communities each in their own industrial and geographic social worlds. These two dynamics, fragmented communities and a lack of widely-shared time-consistent beliefs, are likely to generate negative feedback mechanisms that further divide high-end corporate actors along industrial and geographic boundaries.

Irrespective of the reasons behind the findings about these two intrinsic dimensions of a transposition-enabling socio-relational context at the scope of the high-end corporate social structures of LA and the Bay Area, the findings in this and the previous section confirm the hypothesis that the Bay Area's transposition-enabling socio-relational context is evident at the scale of its high-end corporate community, and absent in Southern California. This evidence a) corroborates the widely-held premise in the literature about the Bay Area's transposition-enabling socio-relational context; b) substantiates the hypothesis that an equivalent socio-relational context was absent in Southern California, thus contributing an additional piece of evidence in support of the hypothesis that the divergence was partly-driven by the distinct socio-relational contexts in the two regions (through their role in industrial evolution and consequently per capita incomes); and c) that the Bay Area's transposition-enabling socio-relational context is evident at the scope of its high-end corporate social structure, or in other words the highest echelons of the region's 'intellectual world of production', which in the literature is characterized by its symbiotic relationship with the 'tinkering' experimental-entrepreneurial world.

The evidence in the past two sections thus points to the likeliness that the 'intellectual' world of well-established large firms in the Bay Area shares the key characteristics of the transposition-enabling socio-relational context shown in the literature to

characterise the entrepreneurial world. This could explain how these two worlds are able to co-evolve in a symbiotic relationship despite the inherent threats they pose to each other.

In pursuit of the scope of the Bay Area's transposition-enabling socio-relational context, in the next section two canonical social capital measures are explored as a proxy for a society-wide transposition-enabling socio-relational context.

CHAPTER 5: SOCIETY-WIDE SOCIO-RELATIONAL CONTEXT

In this section the analysis shifts and broadens in scope from the high-end corporate social structure to the regional society at large. Research on the IT industry in Silicon Valley, and the biotechnology industry and high-end entrepreneurship in the Bay Area highlight the catalytic role played by a transposition-enabling socio-relational context, characterized by university-industry relations (Casper, Forthcoming; Saxenian, 1996), relations between venture capitalists and entrepreneurs (Kenny and Florida, 2000), lawyers and entrepreneurs (Suchman, 2000), large firms and entrepreneurs through spin-offs (Saxenian, 1996; Kenny and Von Burg, 2010), public R&D facilities and small and medium sized enterprises (Feldman, 1994b) and communities of practice that connect firms across the 'intellectual' world (Brown and Duguid, 1991). The research in the previous two sections found evidence that the transposition-enabling socio-relational context in the Bay Area also operates at the scope of the high-end corporate social structure (i.e. between the leaders of the largest firms in the 'intellectual world'). Here the analysis broadens to gauge whether a transposition-enabling socio-relational context can be detected at the scale of society at large. To do so this research draws heavily from the literature on social capital.

The social capital literature is based on the notion that certain features of socio-relational contexts, or conventions and relations, such as norms, trust, identities and

membership, determine the propensity for cooperation between agents (Fukuyama, 1999). Putnam defines social capital as "features of social organization, such as networks, norms and trust that facilitate co-ordination and cooperation for mutual benefit" (Putnam, 1993-p.38).

When these characteristics operate exclusively within communities, they are considered as 'bonding' social capital, and when they operate across diverse communities, they are considered as 'bridging' social capital. Bonding social capital is arguably a necessary pre-condition for bridging, as otherwise there would be no communities to bridge across in the absence of bonding. Bonding social capital in the absence of bridging, or what Fukuyama conceptualizes as a narrow radius of trust, risks generating lower standards of moral behaviour as people might act in the interests of their narrow conceptions of community (such as family, tribe, religious group or criminal organization) at the expense of other communities and society at large (Fukuyama, 1999). This is why social capital is often associated with its potential negative externalities in the form of rent-seeking behaviour and principle-agent problems (Rodriguez-Pose, and Storper, 2006).

There was a time therefore when social scientists considered social capital as a second-best to formal rules and laws, and thus considered social capital as only necessary in primitive societies, in the absence of formal institutions. Modern societies, it was thought, do not need social capital as the informal conventions and relations that under-pinned economic coordination are replaced by formal institutions. In modern societies it was thought, 'society' offered the necessary incentives for coordination, and did this so effectively that arms-length transactions could be performed with full confidence, even without the counterparts knowing each other personally or belonging to the same community; the judiciary and the coercive power of the state infused actors with the trust that others will do the right thing despite the incentives to do otherwise.

In recent years however, social capital has come to be recognized as a much more cost-effective and efficient mechanism for coordinating transactions and relations, especially those which are based on tacit forms of knowledge and high levels of complexity and uncertainty, as is often the case in innovative industrial districts and high-tech regions. In such contexts conventions and relations can offer much more cost-effective forms of constraints, monitoring and sanctioning than formal rules and laws, allowing agents to develop traded and untraded interdependencies at much lower transactions costs than formal institutions (Fukuyama, 1999, Storper, 1997). Geographers, sociologists and some economists therefore consider informal institutions as important sources of public goods (Coleman, 1990; North, 1990) and market organization (Granovetter, 1985; Grabher, 1993; Akerlof and Kranton, 2010).

While social capital is a multi-dimensional concept, due to the countless aspects of conventions and relations that can either facilitate or constrain trust, cooperation and other positive externalities, research has predominantly focused on two aspects of social capital: Generalized trust , such as subjective feelings of membership, benevolence and affinity which can be gauged from survey data (Fukuyama, 1999; Knack and Keefer, 1997; Zak and Knack, 2001; Knack, 2003; Beugelsdijk and van Schaik, 2004; Bengtsson et al, 2005); and the extent of formal and informal associationalism, operationalized as time spent with colleagues and friends (informal associationalism), and formal associationalism which can be categorized into Putnam and Olson groups. Putnam groups include the size, number of organizations or membership in civic organizations (known as 'Putnam Groups' - including or excluding religious organizations depending on the researcher's theoretical outlook) (Putnam, 1993 and 2000; Beugelsdijk and van Schaik, 2005; Knack, 2003), and groups with an open vested economic or political interest such as trade unions, political parties and professional

associations (known in the literature as Olson Groups – or formal associations) (Storper and Rodriguez-Pose, 2006; Boix and Posner, 1998).

A broad scope of trust acts as a bridge across diverse communities, thus reducing the risk from excessive bonding in the absence of bridging (such as when people are honest towards their family and friends and dishonest and corrupt towards others and even in public life). A high degree of associationalism argued Alexis de Toqueville as far back as the first half of the 19th Century gives political voice to otherwise voiceless and disempowered individual citizens, and civil associations "serve as 'schools of citizenship' where individuals learned the habits of cooperation" (Fukuyama, 1999-p. 8).

The research that follows in this and the next sections of this chapter draws from the social capital literature to investigate whether a transposition-enabling socio-relational context can be detected at the scope of the regional society at large in LA and the Bay Area over the course of the divergence period. Two measures of social capital are used as proxies to this end: 1) Generalized trust and benevolence, and 2) the size of the civic sphere.

Generalized trust and benevolence are used as a proxy for widely-shared perceptions. Trust is arguably the most fundamental of perceptions people must hold in order to have the confidence to collaborate with each other. Benevolence is the other side of the same coin, whereby people feel goodwill towards others - i.e. people are trust-worthy. Trust and benevolence are thus used in this study as a proxy for widely-shared transposition-enabling perceptions and belief systems.

The literature highlights the role of civic organizations as 'schools of citizenship' where people learn to cooperate and coordinate with others. The larger the non-profit sector in society, the greater the learning experience from collaboration and thus the greater the

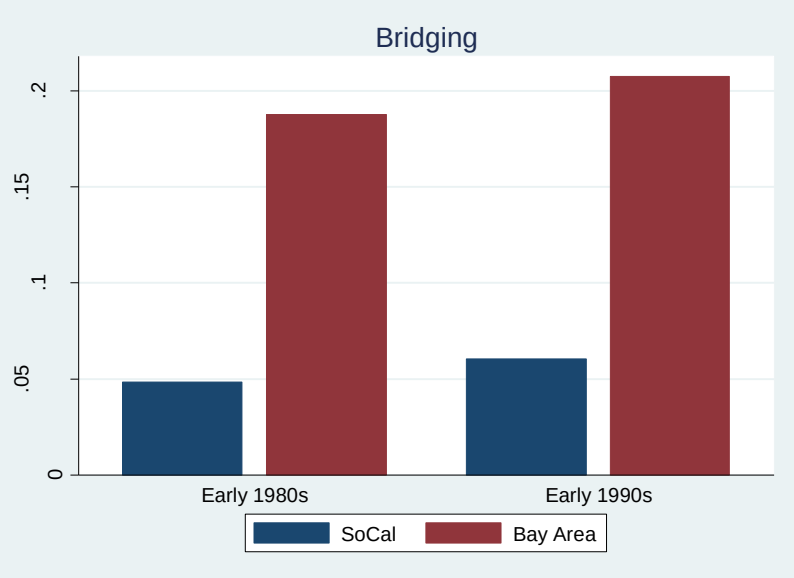
propensity for cross-realm relations or cooperation across distinct communities. While civic membership alone is not necessarily an indication of cross-realm relations in society, a large and dynamic civic sphere does increase the chances of people from diverse communities collaborating for a common cause, which in itself generates cross-realm relations. Moreover, a large civic sphere together with generalized trust and benevolence further augments the propensity for cross-realm relations. Therefore generalized trust and benevolence, and the size of the civic sphere will be used as proxies for a transposition-enabling socio-relational context at the scope of society at large.

GENERALIZED TRUST AND BENEVOLENCE

The DDB Needham Lifestyle Survey was used to construct a proxy measure for bridging social capital, based on a composite average of responses to questions that were categorized under 'generalized trust' and 'benevolence' in the survey (See Appendix 6 for details). This survey was conducted for most years between 1977 and 1998. Due to small sample sizes across counties, the data was aggregated into two decades, 1977-1987 and 1988-1998.

Responses to four questions were chosen to represent generalized trust: Whether respondents believed there should be a gun in every home; whether they worry about themselves or family members becoming victims of crime; whether they always lock doors even when they leave for just an hour; and whether they considered most welfare recipients as lazy cheats. The following four questions were selected as proxies for the degree of benevolence: Whether they did volunteer work; recycled; gave blood or contributed to an environmental or conservation organization. The eight questions were given equal weighting in constructing the standardized index.

Figure 9: *Average responses on indicators of generalized trust and benevolence ('bridging' perceptions) for LA and the Bay Area, 1977-1987 and 1988-1998.*



Source: Author's calculations using DDB Lifestyle Survey.

Findings from these surveys show that respondents in the Bay Area are almost four times more generally trusting and benevolent than their counterparts in LA. Figure 9 above shows that the Bay Area's generalized trust proxy was fully 3.8 times that of Southern California in the early 1980s and 3.5 times higher in the early 1990s. The average US figure (calculated as the mean of all respondents in the survey) was -0.053 in the 1980s and 0.051 in the 1990s, much closer to the LA figures. This finding is offered as evidence that the Bay Area enjoys a higher degree of transposition-enabling perceptions and beliefs; the more people feel generalized trust and benevolence towards 'others', the more likely they are to forge relations with people beyond their immediate family, friends and community. A generalized sense of trust and benevolence in society at large conceivably contributes positively to a propensity to collaborate with people from different 'realms' or communities. Whether the Bay Area also possesses more numerous civic associations ('schools of

citizenship') through which people can gain coordination experience around collective goals is the subject of the following section.

THE NON-PROFIT SECTOR

Organizations in the non-profit sector are categorized into more than 30 types of nonprofit organizations by the United States Inland revenue Code, of which by far the largest subsection is the 501c3 'Public Charities', representing almost 60% of all registered non-profit organizations, 60% of total non-profit assets and 70% of total non-profit revenues in the United States in 2010. These include arts, education, environment, healthcare and human services amongst other types of organizations to which donors can make tax-deductible donations (Blackwood et al, 20102). In addition to 501c3 'Public charities' the nonprofit sector consists of 'Other' 501c organizations, and 501c3 Private Foundations. In this section the size and sectoral composition of 501c3 Public Charities and 'Other' 501c nonprofit organizations are measured and compared over time across the two regions.

All nonprofit organizations with revenues greater than $50,000 must file a form 990 with the Inland Revenue Service (IRS), where they must declare their total revenues. The National Centre for Charitable Statistics, the primary source of data on the nonprofit sector in the United States, extracts financial and other information from forms 990 and stores this data into historical and publicly available databases which can be accessed for a considerable fee. Several databases were accessed through the NCCS membership of the Social Welfare department at UCLA.

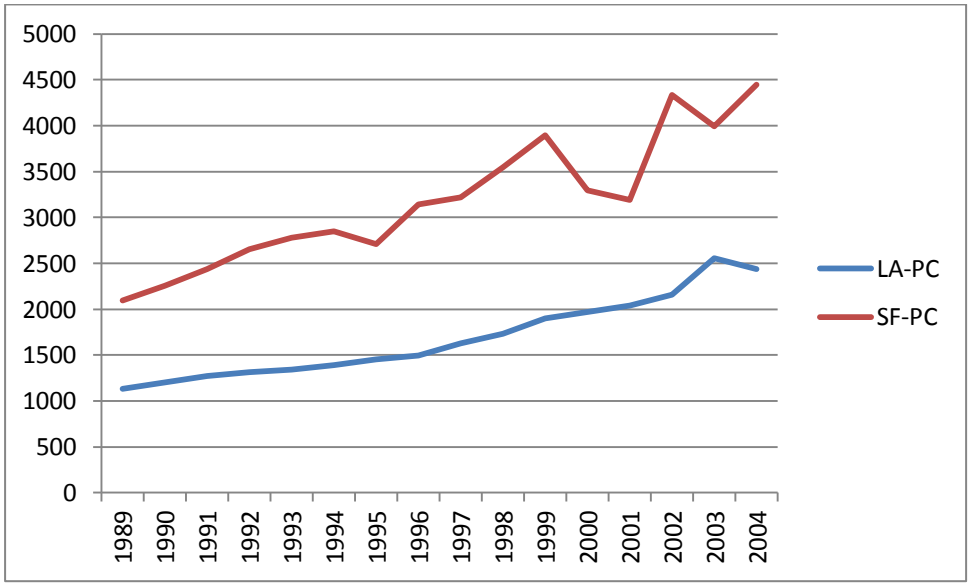
In order to make a fair comparison of the 501c3 'Public Charities' sector in a way that takes into account the difference in the two regions' population sizes, total revenues or assets are also presented in per capita terms. The analysis runs from the year 1989 to 2004, the years

for which data was available from the NCCS. One outlier was removed from the analysis, the Kaiser Foundation Healthcare Inc., which alone contributed $20Bln. in total Bay Area revenues in 2004 for example, and 30% of total Bay Area revenues that year. Being a California-wide organization which happens to be headquartered in the Bay Area, removing it from the analysis does not disfavor the Bay Area but rather redresses the balance to make a fairer comparison.

The size of the overall non-profit sectors

Back in 1989 the Bay Area's total per capita revenues was just under $2,100, 1.9 time that of Southern California's. By 2004 the per capita revenues of the Bay Area's 'Public Charities' had increased to $4,450, 1.8 times that of Southern California's. Even if occasional dips in SF's total revenues are taken into account, namely the large dip at around the time of the dot-com bust, Northern revenues are on average1.9 times greater than Southern California's between 1989 and 2004. These figures are presented in figure 10 below.

Figure 10: *501c3* 'Public Charities' - *Total Revenues per capita, 1989-2004*

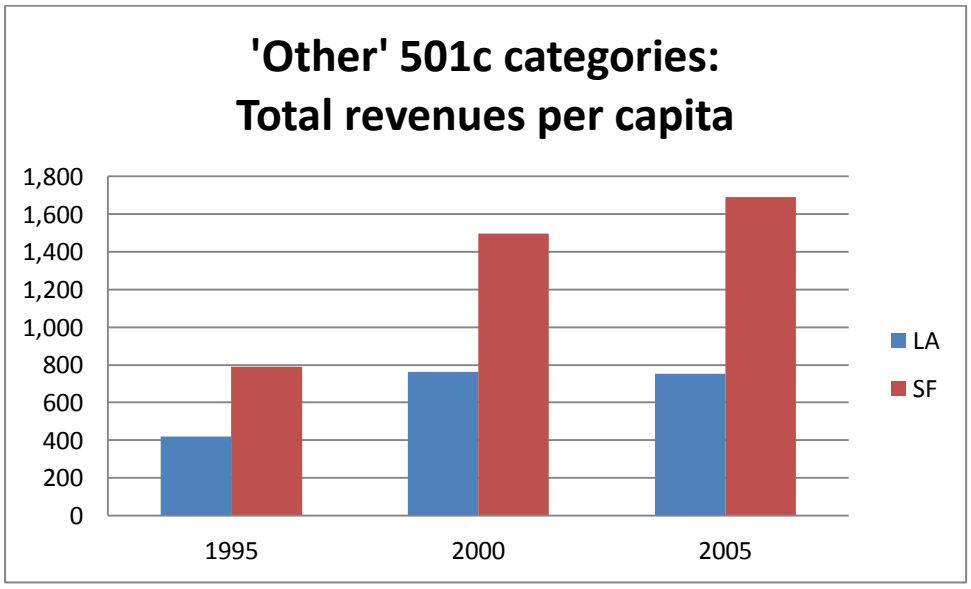


Source: Author's calculations using NCCS 'Public Charities' database (Excluding the Kaiser Foundation)

Turning to 'Other' 501c organizations which in 2012 represented about a third (32%) of all nonprofit organization in the US (NCCS Business masters file, 12/2012), this 'Other' sector is predominantly composed of 501c4, Social Welfare organizations such as big HMOs or managed health plans, a mix of advocacy groups and civic clubs; 501c5 Labor Unions and farm bureaus; 501c6 Business Leagues; and 501c7 Social and Recreational Clubs. In addition to these four major sub-categories the sector is composed of 15 to 20 other small categories that include veterans' organizations, fraternal organizations, cemetery companies and credit unions. Credit Unions were excluded from the analysis due to missing data issues.

The 'Other 501c' non-profit sectors of the two regions were analyzed for the years 1995, 2000 and 2010, using available data from the NCCS. In each of these three time periods LA total per capita revenues were on average 60% those of the Bay Area's. These results are presented in figure 11 below.

Figure 11: *Total Revenues per Capita of 501(c) 'Other' organizations (Excluding Credit Unions), 1995, 2000 and 2010*



Source: Author's calculations using NCCS database on 'Other' 501c organizations, 1995, 2000 and 2010. Credit Unions were excluded due to missing data.

The above analysis has revealed that the Bay Area's nonprofit sectors, both 501c3 public charities and 'other' 501c organizations, in terms of per capita revenues are almost double Southern California's, and have been so consistently over the past two decades for which data is available. These differences might however due to a few disproportionately large organizations that skew the data, so in the next section the sectoral composition of the two regions is analyzed, to better understand the source of the massive difference in the two regions' civic spheres.

Identifying the source of revenue differences

In addition to the fairly broad categorization by the United States Internal Revenue Code, nonprofit organizations are categorized by the National Center for Charitable Statistics (NCCS) across much more disaggregated sub-sectors. This finer-grained categorization is called the National Taxonomy of Exempt Entities (NTEE). The overall sector is broken down into 26 Major groups (consisting of 10 broad categories), and each Major group is itself broken down further into 2-digit decile codes called NTEECC categories in the NCCS databases.

Having established that the Bay Area non-profit sector has been on average 1.9 times larger than Southern California's on a per-capita basis over time, the sources of this considerable size difference is analyzed here. Such size difference might be due to either disproportionately large organizations that skew the data, or a few disproportionately large sub-sectors, or both.

First the total number of organizations in the two regions is examined, both overall and by Major group, in order to gain an initial insight as to whether the large revenue differences are due to a few organizations with disproportionately large revenues, and if so

across which sectors. In 2004/05 Southern California's nonprofit sector (excluding Private Foundations) consisted of 18,394 organizations, and 13,127 organizations in the Bay Area. Adjusting for population size, the Bay Area has 1.8 times the number of organizations than Southern California, almost identical to the difference of 1.9 in total per capita revenues. From this one can draw the conclusion that the difference in the per capita revenue size of the two regions' nonprofit sectors is not primarily due to a few disproportionately large organizations, but rather to a larger sector overall consisting of more numerous organizations.

The difference in the population-weighted number of organizations across Major Groups was also analyzed. On average, Bay Area Major Groups had 1.9 times the number of population-adjusted organizations than Southern California's, again identical to the difference in total per capita revenues. These findings show that the Bay Area's aggregate per capita size difference is driven neither by disproportionately large organizations, nor disproportionately large Major Groups, but rather by more numerous organizations across most major groups. The Bay Area's civic sphere is proportionately double the size of LA's.

SUMMARY – PART II

The analysis in Part I offered compelling evidence that the Bay Area's transposition-enabling socio-relational context was likely to have contributed substantially to the LA-Bay Area divergence by 'steering' the two regional economies down very different industrial pathway by enabling the re-combination of people, firms and institutions in the Bay Area to better absorb, develop and commercialize new emerging knowledge. The three chapters in this Part II of this three-part research was designed to a) explore the scope of the Bay Area's transposition-enabling socio-relational context over the divergence period, and b) corroborate

the argument presented in Part I by contrasting the presence of such a transposition-enabling context in the Bay Area with its absence in Southern California.

The first two chapters of Part II above explored the socio-relational context at the scope of the high-end corporate social structure (the highest-echelons of the two regions' 'intellectual' world of well-established corporations); and the third chapter explored the extent to which findings at the scope of the corporate social structure were also reflected at the broad scope of the regional society at large.

The first chapter used network analysis techniques to analyze the structure of board interlocks amongst the high-end corporate social structure of the two regions, and found that while both regions' were very similar back in 1980, over the divergence period LA's fragmented substantially while the Bay Area's maintained a high level of overall inter-firm connection, as well as relations that across industrial and geographic boundaries. Moreover the analysis also confirmed that the Bay Area's business-civic realizations were more central than LA's, with the Bay Area Council arguably playing the role of an 'anchor tenant' within the overall corporate network. This analysis offers some evidence that a transposition-enabling relational context characterized by a high degree of cross-realm relations and a highly-central anchor-tenant was evident at the scope of the high-end corporate social structure in the Bay Area.

The analysis of perceptions and belief systems in the second chapter of Part II above offered some evidence that the high-end corporate social structure in the Bay Area also enjoyed appropriate, widely-shared and time-consistent perceptions about the rapidly changing economic climate and the role of the region within it. Together, findings in the first two chapters of Part II of this study offer compelling evidence of a transposition-enabling

socio-relational context as the scope of the Bay Area's high-end corporate social structure, characterized by a high degree of cross-realm relations, the presence of an anchor tenant, and widely share perceptions and belief systems.

Southern California's high-end corporate social structure on the other hand fragmented completely over the divergence period, and its perceptions vacillated a great deal from decade to decade. By the 2000s its high-end corporate social structure perceived the regional economy as a global hub for international trade and a center of low-waged light-manufacturing, arguably inappropriate for a high-cost region which until the 1980s was one of the most successful regions in the country, successfully growing both its wages and its population.

The third chapter explored the degree to which these corporate-level findings are reflected at the regional society at large. Drawing from the social capital literature the analysis showed that the Bay Area region's society was more generally trusting and benevolent, and its civic sphere was proportionately about double Southern California's. These findings suggest that the Bay Area's transposition-enabling socio-relational context is evident at the broad scope of its society at large, with a greater propensity for cross-realm relations and coordination enabled by widely-shared perceptions that 'others' can be trusted, and a large civic sphere through which actors gain experience in coordination for common goals.

The findings in this Part II of the overall research thus presents compelling evidence that the Bay Area's transposition-enabling socio-relational context operates at a broader scope than the 'tinkering' experimental-entrepreneurial world characterized by a high number of dealmakers (the 'anchor-tenants' at the scale of the high-end entrepreneurial economy), the

biotechnology industry (Powell et al., 2010), and other narrower scopes of analysis in the literature which highlight the role of VCs, lawyers and communities of practice as channels of knowledge and connections.

Why does the Bay Area enjoy a transposition-enabling socio-relational context at multiple scopes of analysis? Is it due to a 'regional-effect', whereby broad-scoped intra-regional cross-ream relations and widely-held perceptions and belief systems spread down to people, firms and institutions in various industrial 'worlds of production', or did the transposition-enabling socio-relational context emerge from the IT industry back in the 1960 and '70s or even as far back as the 1930s and 40s, and 'spread-out' to the broader industrial structure and society at large? That is the subject of the next Part III of this study.

PART III - HITORICAL ORIGINS

> *Individuals with common cultural backgrounds and experiences will share reasonably convergent mental models, ideologies, and institutions; and individuals with different learning experiences (both cultural and environmental) will have different theories (models, ideologies) to interpret their environment (Denzau and North, 1994-p. 1-2)*

Having argued in Part I that the Bay Area's transposition-enabling socio-relational context played a key role in the region's extraordinary income growth between 1980 and 2010, through its impact on the region's industrial trajectory, and some evidence in Part II that the scope of the Bay Area' socio-relational context operates at the scope of the high-end corporate social structure and possibly society at large, here in Part III the analysis attempts to trace the historical origins behind the Bay Area's transposition-enabling socio-relational context by exploring its possible roots in the region's civic and political/cross-jurisdictional spheres since the early 20th Century.

Douglass North argues that our beliefs and perceptions of reality emerge and evolve through individual and social learning, and moreover that "*the interaction of learning individuals gives rise to change in society, polity, economy, and organizations*" (North, 2003- p. 2). This Part III of this research explores social learning processes that give rise to widely-held perceptions and belief systems in the two regions' civic and political/cross-jurisdictional spheres. Social learning experiences in these broad spheres can also generate cross-realm relations between actors from diverse groups through the formation of coalitions around specific civic and political issues. This part of the research will thus explore the degree to which widely-held belief systems and cross-realm relations emerged in these two civic and political spheres over the course of the 20th Century, in order to weigh the plausibility of proposition 3, which claims that the Bay Area's transposition-enabling socio-relational context can be traced back to historical developments in civic and political spheres. Findings from this study together with evidence from Parts I and II will be used in the final part of this research to weigh one way or the other on the 'regional effect' hypothesis which claims that a regional transposition-enabling socio-relational context acted as an institutional catalyst to the many events and 'accidents' which are widely recognized to have led to the genesis of the IT industry and the region's highly innovative and entrepreneurial industrial structure more generally.

The research on the two regions' civic and political/cross-jurisdictional spheres is done by analyzing and triangulating between several historical analyses previously conducted in the literature, and substantiated with anecdotal evidence from interviews. The analysis begins by briefly discussing the legendary story of the cybernetic revolution in the Bay Area, as a story of transposition between the cybernetic and the utopian hippie communities of the Bay Area, as told by Fred Turner in his seminal book, "From Counterculture to Cyberculture:

Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism" (Turner, 2006).

The story highlights the role of the widely-shared ecological perceptions and belief systems in the Bay Area which the subsequent section traces in the region's environmental movement from the founding of the Sierra Club in the last decade of the 19th Century to the 1980s, by which time the Bay Area had become a globally-recognized poster-child of environmental activism, characterized by over 80 years of socially and geographically cross-cutting environmental initiatives and coalition-building across the Bay Area.

The Bay Area is composed of 10 Counties and 106 cities[15] characterized by intense cross-jurisdictional competition, with at least two jurisdictions, Alameda (the East Bay/Oakland), and Santa Clara (San Jose), with grandiose visions of becoming self-contained urban cores in their own rights to rival San Francisco back in the mid-20th Century. Southern California's five Counties are massive jurisdictions composed of 174 cities, equally characterized by inter-jurisdictional competition and a thirst for independence from the central core of downtown LA throughout the 20th Century. In such a competitive political context, to what extent do the two regions overcome the herculean challenge of cross-jurisdictional competition by coordinating around collective goals in the form of regional projects and initiatives? This is an important question because essentially it tests the degree to which a transposition-enabling socio-relational context extends to the cross-jurisdictional political landscape, in addition to the socio-civic sphere (counterculture and ecological environmentalism). This question is addressed by comparing major regional projects and initiatives in the two regions since the early 1900s.

[15] Source: The California Planner's book of lists <http://ceres.ca.gov/planning/bol/1999/city_by_county.html>

CHAPTER 6: THE CIVIC SPHERE

FROM COUNTERCULTURE TO CYBERCULTURE

The socio-technological trajectory of the Bay Area's IT industry as it began to unfold since the early 1990s, manifest by social media, open-source, democratization, flat organizational structures, rooted in visions of an egalitarian and environmentally sustainable de-nationalized global village, was in no small part shaped by the Bay Area's counterculture, argues Fred Turner in his seminal book, "From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism" (Turner, 2006) (Turner, 2009). Turner traces the socio-technological trajectory of the IT industry and the internet to the 1960s, when two social worlds in the Bay Area were brought together in the most unlikely fashion: The military industrial research culture, and the bohemian counterculture.

Turner ascribes the transition from the 'grey' 1940s and 1950s cold-war era characterized by "rigid social norms, [and] hierarchical institutions" to "a free-wheeling, inter-disciplinary, and highly entrepreneurial style of work" to the military industrial-research world that developed nuclear weapons and the super-computers of the first half of the 20th Century (Turner, 2009-p. 4). This cultural evolution was driven by defense-industry personnel, from soldiers and administrators to scientists and engineers who "broke down the invisible walls of bureaucracy and collaborated as never before" (Turner, 2009-p. 4). These actors, inspired by authors such as Marshall McLuhan, Buckminster Fuller and the mathematician Norbert Wiener, developed a shared techno-vision of "institutions as living organisms, social networks as webs of information, and the gathering and interpretation of

information as keys to understanding not only the technical but also the natural and social worlds" (Turner, 2009-p. 4).

By the 1960s this cyber-vision came to be shared by "substantial elements of the counterculture" (ibid, p. 4), including 'back-to-the-landers' who traded their urban and suburban lives for burgeoning communes in woods and mountains as well as a broader regional movement of people disillusioned by the political system. While many groups took the political route for achieving political change, this group of "New Communalists, turned away from political action and toward technology and the transformation of consciousness as the primary sources of social change" (Turner, 2009-p. 4). As the political system and society around them turned to war, riots, conflict and social fragmentation (by the division of labor as they saw it), they set out to change the world from the ground-up, by deploying small-scale community-building and humanizing technologies "from axes and hoes to amplifiers, strobe lights, slide projectors, and LSD" (Turner, 2009, p. 5). Hippies from across the country also read the work of Norbert Wiener, Buckminster Fuller, and Marshall McLuhan, and developed "a cybernetic vision of the world, one in which material reality could be imagined as an information system" (Turner, 2009-p. 5) which gave them hope of global harmony and environmental sustainability, in sharp contrast to the violent and seemingly self-destructing world around them.

It was in this context that Stewart Brand launched the *Whole Earth Catalogue*, which through its publications ("The last Whole Earth Catalogue" in 1971 won the National Book Award and sold over 1 Million copies) and subsequent initiatives (such as the WELL – The Whole Earth 'Lectronic Link'), publications and real-world forums between the 1960s and the 1990s played a highly-influential role in transposing perspectives and belief systems across the two emerging worlds of cybernetics and utopian-counterculture. The resulting and

evolving cross-realm transposition argues Turner came to shape the socio-technological trajectory of the IT industry, with its consequent global impact. The Whole Earth Catalogue and later Wired magazine and the network of people behind these initiatives proved so successful, that they essentially substantiated the vision of a non-hierarchical networked-entrepreneurial society which they invoked. Their economic success and their recognition at the highest echelons of the political and corporate spheres in the US and abroad "became evidence for the transformative power of what many had begun to call the 'New Economy'" (Turner, 2009-p. 7).

The history of the cyber-utopian transposition highlights the critical and catalytic role it played in shaping the socio-relational context of the IT industry as it evolved and unfolded in the Bay Area. This story falls neatly into the evolutionary economic perspective proposed by Freeman, who argues that the study of economic development must shed light on the autonomous evolution and interactions between the spheres of science, technology, economics, politics and culture (Freeman, 1995-p. 16). Historically this story can be traced back to the encounters between the communities from the worlds of the military research industrial complex, and the utopian-hippie, anti-war, free-speech and environmentalist communities in the 1960s. It exemplifies the role of both technology and the regional socio-relational context in the development and evolution of an industry-level socio-relational trajectory. Even Steve Jobs the founder of Apple Computers described the Whole Earth Catalogue as one of the bibles of his generation in his 2005 commemoration speech at Stanford University (Stanford News, 14 June 2005 – Jobs Speech Transcript). In fact Apple's first televised ad campaign in 1984 associated the brand with "the demolishment of a totalitarian Big Brother" (The New York Times, 25 Sept. 2006), attesting to its countercultural roots.

As for the New Communalists, they reflected the ecological mind-frame of the region's broader environmental movement, and Brand himself even studied ecology and a systems-oriented view of the natural world at Stanford University (Turner, 2009-p. 43). By 1990 argues Turner, "the economic ambitions of the corporate executives [had fused] with the ecological ideals and tribal cultural sensibilities of the New Communalist Movement" (Turner, 2009-250). The Bay Area's ecological and anti-war utopian movement, under the umbrella of a counterculture, was thus the other half of the coin of this cross-realm transposition which gave rise to the early socio-relational context of the IT industry back in the 1960s and '70s.

As will become evident in the next section, the environmental movement in the Bay Area can be traced at least as far back as the last decade of the 19th Century, developing into a dynamic social movement that cut across social and geographic/jurisdictional boundaries in the Bay Area. The movement's ecological philosophies and environmental consciousness were thus shared far and wide in the Bay Area region as a whole, by the grass-roots and corporate and political leaders alike, setting the scene for what is arguably one of the most influential cross-realm transpositions in the history of industrial development.

BAY AREA ENVIRONMENTALISM

Bay Area environmentalism exemplifies the networked civic activism of the region which erupted into one of the nation's most prolific anti-war movements against the Vietnam War, spearheaded by students at UC Berkeley. The region's environmental movement dates at least as far back as 1892 when the Sierra Club was founded, in reaction to San Francisco's proposal to flood the Hetch Hetchy Valley, in what is now Yosemite National Park, in order to supply water to itself. The Bay Area became the epicentre of the US environmental

movement, leading to creation of the National Park Service in the 1910s, and the state park system in the 1920s. The state-wide organization called the Save The Redwood League also grew out of Bay Area environmentalism, and the national wilderness protection movement, notably organized via the Wilderness Society, emerged in the 1930s.

By the 1950s, these conservation movements turned their attention increasingly to their home region. California's suburbs were expanding rapidly into the agricultural fringe of the Bay Area in the 1950s. The Bay Area environmental movement responded by advocating the region's first Greenbelt Act of 1955, in Santa Clara. They subsequently scaled up their regional experience to the state as a whole, leading to the state-wide California Land Conservation Act of 1965 (Williamson Act), which offered agriculturists tax relief in return for not converting their land to urban use.

Between the 1950s and 1970s the Bay Area environmental movement focused on urban containment and the creation of a regional greenbelt, accompanied by a movement to create a Bay Area regional planning organization. This movement can be traced back to three groups: Telesis, a group of planning students from UC Berkeley in the 1930s "mounted an influential exhibit called 'Space for Living' in 1939 that awakened san Franciscans to modern planning and architecture and to the idea of an urban greenbelt" (Walker and Cronon, 2008:192). A second group came out of the Bureau of Public administration in UC Berkeley which was "steeped in the Progressive tradition of municipal reform and had long been an incubator of regionalism and good government" (Walker and Cronon, 2008:192); and a third group was a group of critical intellectuals composed of scientists, reformers and journalists who were critical of the environmental impacts of rapid population growth and development (Walker and Cronon, 2008). By 1958 a rare alliance in American politics emerged, consisting of modernist city planners, environmentalists and urban reformers, in the form of Citizens for

Regional Recreation and Parks (Walker and Cronon: 186). Their third conference on open space, led directly to the movement in support of the Quimby Act of 1965, giving local governments the right to require developers to dedicate space for parks or open space, or to charge for park acquisition. In the 1970s attention turned to growth control; cities from across the Bay Area began setting limits to growth, by limiting the number of housing units, sewage hook-ups, timing controls, urban-service limit lines, green lines, city limits, placing large swathes of land in agricultural reserves, and supporting stricter regulations on industrial location.

The long Bay Area history of environmental activism has been strongly based on the ability to form coalitions of both community-based organizations and business and civic leaders. As Walker and Cronon observe in their historical analysis, "[t]he Bay Area environmental story bears witness to the importance of the elite in land conservation and nature protection" (Walker and Cronon, 2008: 37). Bay Area regionalist politics has involved large firms, investors and entrepreneurs from the traditional San Francisco downtown elite, and more recently incorporated large high-tech firms and investors based in Silicon Valley (Brechin, 1999). The organizations and their networks involve a great diversity of participants, from popular mobilizations and broad-based citizens coalitions to intellectuals and academics, scientists, business leaders, political elites, environmentalists, planners, lawyers, journalists and private foundations. The social learning associated with the region's long history of environmental activism thus cuts across jurisdictional and class boundaries. The Bay area's regional organizational infrastructure and social networks for tackling regional issues has been in development, and has deepened and widened as a result, since the late 19th century. The dynamism of the region's environmental movement is evident when the environmental non-profit sector is compared to that of Southern California's, which

between1990 and 2004 were one average 10 times larger in total per capita revenues than its Southern neighbour[16].

Southern California in the 2010s still has no equivalently strong and dense civic fabric, despite signs that the region's civic sphere is showing signs of dynamism and new-found cross-realm coalition building between the progressive civic sphere and the labor unions. As will be discussed in a subsequent section, this recent surge in civic activism in LA is still in its early days and has not yet caught up with the Bay Area's highly cross-cutting civic structure. First however, having shown that a transposition-enabling socio-relational context characterizes the Bay Area's civic sphere in the form of widely-shared environmental consciousness and cross-realm coalition-building, the analysis shifts from the civic sphere to the political/cross-jurisdictional sphere.

CHAPTER 7: POLITICAL/CROSS-JURISDICTIONAL SPHERE

This chapter shifts focus from the civic sphere which in the previous chapter was shown to be highly dynamic and cross-cutting across social, geographic and other intra-regional realms, to the political cross-jurisdictional sphere. Both regions are characterized by highly fragmented jurisdictional landscapes, both in terms of the number of counties and cities across the region, as well as the number of single-purpose regional agencies. Both regions failed to develop a truly regional government with overriding powers despite herculean attempts to do so by very powerful interests, especially in the Bay Area, due to the resistance of local jurisdictions. In an attempt to detect a transposition-enabling socio-relational context across the regional political landscape, this chapter compares and contrasts major regional projects and initiatives over the course of the 20th Century.

[16] Source: Author's calculations using NCCS data.

The study of the environmental movement (with reference to the broader civic activism and counterculture of the Bay Area in the 1960s and '70s) bears witness to a regional scale transposition-enabling socio-relational context. The Bay Area developed widely-shared ecological belief systems and cross-realm relations characteristic of a highly dynamic environmental movement, which played a critical role in the genesis of the IT industry's socio-relational context through the cross-realm transposition so elegantly described by Fred Turner in his book title, "From counterculture to cyberculture" (Turner, 2009). The analysis that follows cannot be so directly related to the genesis of the IT industry, but it does offer some evidence that a transposition-enabling socio-relational context was also evident at the scope of the Bay Area's political/cross-jurisdictional sphere. By contrasting the Bay Area and Southern California's propensities for cross-jurisdictional coordination, additional lessons are drawn about the Bay Area's regional characteristics which have facilitated cross-jurisdictional coordination despite severe structural political impediments in both regions. These additional characteristics are first nature geography, the jurisdictional landscape and the relative stage of physical development by the mid-20th Century.

The analysis is presented in two sections; the first section will show that up until around the 1950s, the two regions were very similar in their capacities for implementing large-scale projects and initiatives; the second section will show that by around the 1950s the two regions diverged in their propensities for cross-jurisdictional coordination around regional projects and initiatives.

'Regional projects and initiatives' refer specifically to projects with major regional scale impacts or spillover effects; such projects include certain types of hard infrastructure or

major facilities, and sometimes involve region-wide regulation (such as air or water, coastal management or protection of open space).[17]

FIRST HALF OF THE 20TH CENTURY: REGION-BUILDIN

Both LA and the Bay Area were rapid developers in the late 19th and early to mid-20th centuries, 'paving the way' for subsequent industrialization and population growth. During these early development phases, both regions implemented ambitious regional-scale infrastructure projects; for example, in the early 1900s, both San Francisco and Los Angeles developed infrastructure to import water from inland California to the semi-arid coastal zones they occupy: the Los Angeles Aqueduct (Owens Valley) and the Hetch Hetchy dam and reservoir (Sierra Nevada, now Yosemite National Park). In the first half of the 20th century both the Bay Area and Southern California also built extensive rail transit systems. Los Angeles and the surrounding region were serviced by two rail systems: The Yellow Cars, a system of streetcars in central Los Angeles; and the Red Cars, a regional electric railway system connecting Los Angeles, Orange, Ventura, San Bernardino and Riverside. In the Bay Area the Key System linked downtown Berkeley to the ferry pier, for boat connections to San Francisco. In addition to rail networks, both regions engaged in large-scale construction of roads and highways, catalysed by the Federal Highway Act of 1925, the Breed Act of 1933 and the Collier-Burns Act of 1944. These were State-led projects, but were accompanied by urban road construction projects in both regions.

[17] This study consisted of two stages: First a timeline of regional projects and initiatives was developed, from interviews and archival research. In the second stage in-depth research on each regional initiative was carried out using literature reviews and other historical sources. Findings were corroborated with anecdotal evidence from interviews.

Both regions also developed regional strategies for reducing air pollution. Smog attacks in Los Angeles became increasingly common and severe in the first half of the 20th century, with a severe smog attack as early as 1903 mistaken for an eclipse of the sun by LA residents (Air Quality Management District, 1997). Between 1939 and 1943 visibility deteriorated substantially due to expanding industrial activity. The LA County Board of Supervisors responded in 1943 by appointing a Smoke and Fumes Commission and in 1945, they banned the emission of dense smoke and formed the Office of Director of Air Pollution Control. But only the City of Los Angeles adopted the recommended smoke regulations, with 45 other cities taking little or no action. The supervisors responded with legislation establishing its own county-wide air pollution control district in 1947, over the fierce opposition from the LA Chamber of Commerce and oil companies. This was the first authority of its kind in the nation, and it immediately required all major industries to seek air pollution permits. By 1950 Orange County had formed its own County Air Pollution District (APD), with Riverside and San Bernardino following suit in 1957. The four APDs merged twenty years later to form the South Coast Air Quality Management District (SCAQMD) in 1977.

In the north, Santa Clara County followed Los Angeles County's move to set up its own Air Pollution Control District in the late 1940s, followed by a regionalization process as in Southern California, with the creation of the Bay Area Air Pollution Control District in 1955 (two decades ahead of Southern California), the first region-wide district in the nation (Bay Area Air Quality Management District, 2011). The air district initially included the counties of Contra Costa, Marin, San Francisco and Santa Clara; with Napa, Solano and Sonoma initially included as "inactive members," and then becoming full members in 1971.

The pre-1950s period also saw the construction of the ports of Los Angeles and Long beach. Los Angeles created the Board of Harbor Commissioners in 1907 in anticipation of future growth, and the Southern Pacific Railroad Company completed the first major wharf at the Los Angeles Port in 1912, followed by large-scale expansion in the 1930s.The Port of San Francisco was administered by the State Commission beginning in 1863. They began by improving the harbor, and like its Southern counterpart, grew with subsequent population growth and became a military logistics center during WWII. The State transferred its responsibility for the San Francisco waterfront in 1968 to San Francisco (City and County of San Francisco, 2012). The first half of the 20th century also saw the construction of the two regions' major airports. The LA region's first airport was built by the city of Glendale in 1922, and became operational a year later. United airport (Burbank) opened in 1930 and the Los Angeles Airport (LAX) was built by the City of Los Angeles, and opened to traffic in 1930, becoming the region's principal airport in 1946. In the same period the Bay Area constructed its airports, with the San Francisco Airport opening in 1927.

The two regions thus carried out, in rather similar fashion, the main tasks of region-building. But there was one significant difference. The Bay Area's natural geography, with a bay in the middle of the region, encourages different communities and counties not just to build infrastructure up to their borders which could then be connected, but to seek common engineering solutions to costly cross-bay crossings, involving economies of scale and high sunk costs. Moreover, unlike airports and ports, which can be built and operated by a single major jurisdiction, the political geography of the Bay Area – with many counties fronting the Bay – requires coordination, even when the projects are funded in part by state or federal agencies. The main bridge projects involving multi-county support for state authorization - the Bay Bridge, linking San Francisco and Oakland/the East Bay, and the Golden Gate

Bridge - were both completed in the 1930s. There were no equivalent region-spanning special purpose agencies in Southern California, with its very different natural geography.

SECOND HALF OF THE 20TH CENTURY: THE GREAT DIVERGENCE

The ability of the two regions to carry out regionalist projects that by the mid-1900s required cross-jurisdictional coordination diverged more sharply in the 1950s. The divergence can be seen most evidently in two policy areas: The politics of regional public transit systems; and the Bay Area's need to save San Francisco Bay from infill. These two policy arenas are analyzed and contrasted in detail in what follows.

BART NOT LART

As noted above, both regions constructed local transit systems, and the basic architecture of an inter-city, region-wide streetcar or rail system. As the two regions matured, these systems came under the dual challenges of the automobile, and intra-regional, inter-city rivalries. By the 1940s, Southern California was embroiled in a debate about what to do with its Red Car system (Pacific Electric Company). The system already connected downtown LA with the other main historical urban centres in Southern California, but urbanization of a set of new, growing cities, was changing the settlement pattern of the region. The Rapid Rail Movement advocated upgrading Pacific Electric's inter-urban rail links, with the goal of connecting downtown Los Angeles with the rapidly growing cities. But the newer urban centres perceived such a plan as "an effort to encroach upon and colonize their hinterlands" (Adler, 1991-p.18). In the meantime the popularity of the automobile as a form of transport was growing, reducing ridership. Hence, both the inter-urban system and the local electric street-car company owned by Los Angeles Railway had suffered operating losses since 1932. Both systems suffered from lack of investment, and fell into disrepair. In this context, the

Automobile Club of Southern California proposed the construction of an extensive network of freeways that would link the region's cities. The LA City Council sponsored a study in 1945 that supported both freeways and rail networks, including the upgrading of the Red Car system, believing that the latter would favor downtown Los Angeles as a location for the headquarters of large companies.

The Council appointed the LA Chamber of Commerce's Metropolitan Traffic and Transit Committee (MTCC), which in turn formed the Rapid Action Transit group (RTAG). RTAG sponsored a transit district enabling bill, and unveiled their $310M regional transportation proposal, 'Rail Rapid transit-Now!', to an audience of 800 business, civic and political leaders in 1948. It was composed of two elements: The inclusion of rail rapid transit lines in the median strips of several freeways around downtown, and the upgrading of Red Car lines to rail-rapid transit status. The urgency expressed by the 'Now!' in the report's title reflected the fact that freeway construction had already begun, and rail lines would have to be constructed in tandem with roads to minimize costs.

The rail portion of the project was opposed by the Los Angeles County division of the League of California Cities. The Long beach City Council unanimously opposed the project, with its Councilman Ramsey claiming that local shoppers would travel to Los Angeles "to buy a spool of thread if this high-speed rail line should be operated" (Pomona Progress-Bulletin, 27 Jan. 1949; cited by Adler, 1987: 11). The Mayor of Claremont opposed the project claiming that citizens "…have no faith in Los Angeles", and the Manhattan Beach mayor echoed this perception of Los Angeles claiming a "…growing resentment…" by people in surrounding cities. An editorial in the Santa Monica Evening Outlook wrote that the project was "…designed to save the Downtown shopping district and at a terrific cost to all taxpayers. No real economic need for it exists beyond the need of downtown Los Angeles

merchants to reverse a twenty-five year old trend" (Santa Monica *Evening Outlook*, 18 April 1949; cited by Adler, 1987: 11).

Opposition to the district bill was even voiced from neighborhoods within Los Angeles that saw themselves as rivals to downtown. The Los Angeles Realty Board, based in the Wilshire District, claimed the project to be 'socialistic' and bound to require taxpayer subsidies perpetually due to LA's relatively low density. In this environment, support for the project evaporated, and the Los Angeles City Council dealt a fatal blow to the RTAG proposal, voting 8:6 against creating a rapid transit district. As Adler summarized the situation, "the competition-generated stalemate would persist, structuring Los Angeles area transit politics for a generation to come" (Adler, 1987: 14)

The Bay Area faced similar challenges, but dealt with them very differently. The war and post-war boom in population had greatly increased congestion and accidents on the Bay Bridge. Two studies were commissioned to find a solution. The Joint Army-Navy Board (JANB) recommended the short term solution of building an alternative rail crossing between Alameda County south of Oakland and southern San Francisco, and a long term solution of a trans-Bay underwater tube connecting rail transit lines on both sides of the Bay. This was the first mention of the BART concept (Adler, 1987: 15). The California Department of Public Works released their recommendation a few days after the JANB report proposing a rail crossing within a mere 300 feet north of the Bay Bridge.

Pitted against each other were downtown Oakland leaders and developers in central Contra Costa County in support of the parallel crossing 300 feet north of the Bay Bridge, and peninsula counties of San Mateo and Santa Clara and southern Alameda County in support of the southern crossing. San Francisco initially supported the southern crossing to reduce

downtown congestion and to divert transcontinental rail terminals to South San Francisco, which at the time went to Oakland. But the railroads opposed this idea, and as a consequence, the San Francisco business community switched its allegiance to the northern crossing, while at the same time launching a movement for a region-wide Bay rail rapid transit system.

Like their counterparts in secondary cities in the LA region (such as Long Beach), Oakland leaders opposed the region-wide rapid rail system proposed by San Francisco. "Oakland, together with several of the smaller East Bay cities, saw the San Francisco transit initiative as another effort to defend the historic pattern of regional domination, and geared themselves for resistance" (Adler, 1987: 17). San Francisco sponsored a transit district enabling bill, just as the LA Chamber of commerce (RTAG) had done. The divergence between the LA and San Francisco rapid transit movements was set in motion when the LA Chamber of commerce dropped support for a rail system in Southern California, while San Francisco business leaders regrouped to battle with their rivals in Oakland. San Francisco's leadership succeeded in gaining passage of a state law forming the Bay Area Rapid Transit Commission (BARTC) in 1951. At this time, both BARTC and LAMTA, its Southern California counterpart, approached the state legislature for funding for regional transportation need assessments in 1953; but BARTC's request was granted, and LAMTA's was rejected. "At this point the two movements radically diverged" (Adler, 1987: 18).

The rift between San Francisco and Oakland was, in turn, resolved by a study entitled Regional Rapid Transit (RRT) conducted by the construction firm, Parsons, Brinckerhoff, Hall and MacDonald (PBHM). Their recommendation for an underwater tube crossing along the existing trans-bay corridor included the convergence of East Bay lines in downtown Oakland, consequently aligning the interests of downtown Oakland with those of San Francisco. But this came at the price of a new rift between this northern coalition and the

southern Bay Area counties of San Mateo and Santa Clara counties, who naturally preferred a southern crossing. An additional hurdle to be overcome was long-standing East Bay plans to create the Alameda-Contra Costa Transit District (ACCTD). ACCTD proponents did not perceive the East Bay Transit system and the Regional Transit System as mutually exclusive, but rather emphasized the importance of East Bay independence and autonomy. San Francisco had its own Municipal Railway, which did not stand in the way of a regional transit system, it was argued. The solution to the deadlock, proposed by San Francisco civic leader Cyril Magnin, was to form a special committee composed of both San Francisco and East Bay members. Members from both sides agreed to support a regional transit system, with San Francisco in turn agreeing to accept the creation of the Alameda-Contra Costa Transit District. Furthermore, interests in downtown Oakland were motivated to keep the regional transit system initiative alive, to counteract dissent within areas of Contra Costa and Alameda Counties which were wary about Oakland CBD power over the east bay transit system. San Mateo County joined BARTD reluctantly, insisting on a pull-out clause at any time before any commitments were made.

San Mateo's doubts resurfaced, in a way reminiscent of the LA-hinterland and San Francisco-Oakland rifts, claiming that "The transit district is designed almost entirely for the purpose of moving people into and out of the San Francisco and Oakland business districts to the detriment of the development of San Mateo County" (Adler, 1987: 22). Indeed, San Mateo County withdrew from BARTD in 1962, followed by Marin County, rendering unfeasible a Golden Gate crossing. Outlying Contra Costa County interests tried to build on this momentum by attempting to pull Contra Costa County out of BARTD, but failed in part thanks to BARTD support by residential developer interests who had long wanted trans-bay rail as a way to prospective suburbanites to employers in downtown Oakland and San

Francisco. Having stepped back from the brink of collapse, a "much smaller BART system than the one envisioned in the RRT limped on to the 1962 ballot, where a very heavy pro-BART vote in San Francisco, linked to the freeway revolt, barely edged it over the top" (Adler, 1987: 23).

Three key factors stand out in explaining the Bay Area's success, and Southern California's failure, to develop a majority in favor of regional rail transit: the stages of development of each region, their natural geography and their inherited geographies of political jurisdictions. To begin with, the LA region still had a great deal of capacity left for future population growth in the middle of the 20th century, because it is a region composed of large flat valleys and plains, interrupted by low interior hilly features; the major mountain ranges (the "walls" of the San Gabriel and San Bernardino Mountains) are fairly far out from the center of the region. In contrast to this, by the mid-1950s, the SF Bay was entirely ringed with development, and though ultimately outlying corridors and valleys would be filled with development, they are generally farther from the core and more fragmented than the equivalent areas available to Los Angeles expansion in the 1950s.

The second factor is the way the Bay acts as a natural spur to inter-governmental coordination, since it is ringed by many counties and cities; as noted earlier, it is impossible to connect these areas merely by connecting decentralized local arterial infrastructure. The connections require conception of major engineering projects with strong irreversibilities and economies of scale, and cost-sharing among the jurisdictions that are not immediately linked. The case of Save the Bay analyzed in the subsequent section highlights the role of the Bay as a collective public good in need of preservation against degradation, thus playing an additional role, as will be discussed, in unifying the counties and communities surrounding it. Southern California region does not have such a unifying geographic feature to require

agreement on the part of multiple regional interests and jurisdictions. Michael Woo, member of the Los Angeles City Council from 1985 to 1993 sums up this difference:

> "I wouldn't dismiss the importance of geography in terms of not just the distance, but in terms of geographic feature like the large body of water that such a high percentage of the population sees or drives by or has some kind of is influenced by, but here there is nothing like that that can galvanize people to do something in the same way the fight to save the Bay led to the creation of BCDC… [T]here is no single dominant geographic symbol that galvanizes people here [in Southern California] the way that, for example, the Bay galvanizes people in the Bay Area" (Interview with Michael Woo, 2010).

The third factor is perhaps the most important. The Bay Area is composed of nine or ten (depending on definition) counties, whereas Southern California, at twice the size, has only five. One county alone, Los Angeles, has a population greater than the entire Bay Area. The battles over BART were predominantly fought across county lines. When opposition to BART emerged in Santa Clara, Marin, and San Mateo counties, it was possible to reconfigure the project and allow a modular version of it to be submitted to Bay Area voters. The three counties that voted majorities for the project were able to authorize a scaled-down project. In Southern California, there is no such granularity of jurisdictions. In particular, the central urban county is very large and internally heterogeneous, ranging from high desert to urban core. If a project fails, even by a small margin, and Los Angeles County withdraws, then there is no basis for regional mass transit.

A counterfactual scenario can illustrate this point. Had Los Angeles County been divided into, say, four counties of equal size, the outlying areas would probably – like Marin,

San Mateo and Santa Clara in the Bay Area – not approved major transit projects. But if just two densely populated hypothetical counties in the urban core of LA had voted to approve, a similar size project, based on their internally more uniform preferences, then a scaled down project, dropping service to less dense outlying areas, could have been given the green light in LA at the same time as this was being done by a similar number of voters in the Bay Area. This is speculation, of course, and many other factors, such as regional political cultures, density, and the absence of a major geographical obstacle in the form of a Bay, might still have caused Los Angeles to reject transit in the 1960s when the Bay Area was moving forward with it. But the interaction of these structural features surely has shaped differences in regionalist approaches to governance.

Alesina and Spolaore (2005) propose a formal model of this phenomenon. The geography of political decision-making faces trade-offs between economies of scale and the structure of preferences of people that fall inside different borders. Large jurisdictions have the advantage of being able to cultivate economies of scale, but they face the challenge of uniting majorities around such big projects, given that their size is likely to group together many groups with heterogeneous preferences. Smaller jurisdictions (such as small countries), have the advantage of very likely being more internally homogeneous, so decisions involve less conflict and lower political transaction costs. But their small size is a disadvantage when projects have a large minimal optimal size, and they cannot take on large projects alone. When they want to carry out bigger projects, they need to form coalitions with other jurisdictions. Viewed through the theoretical lens of Alesina and Spolaore, the Bay Area had several medium-sized counties with majority preferences in favor of BART, but Southern California had none. The Bay Area attempted a region-wide coalition, and failed, but was able to unite enough smaller jurisdictions to achieve the initial minimal scale required to

make BART feasible and to finance it. Such preferences were drowned out in Southern California by their inclusion within bigger, more internally heterogeneous counties, especially Los Angeles.

Mark Pisano's thirty years as Executive Director of SCAG have exposed him first hand to the challenges of achieving cross-jurisdictional coordination in Southern California:

> "We are trying hard to catch up with respect to the business networking, but we have real impediments to doing that and the impediments, this is another interesting feature and that is they did not have excessively large institutions. When you have the city the size of LA and you have the county the size of LA in terms of numbers of people and then you take San Bernardino which is this size, it is the largest county in the United States (in land area), when you take the size of our jurisdictions, it hurts, it breaks down, or you develop impediments to pulling people together. I mean whenever you get big dogs in the room they will pick up the space and the little dogs are all pushed out of the way. Well the Bay area you really didn't have any huge big dogs. I mean you had San Francisco, who thought they were the big dog on the block, but population wise they weren't and economic wise they weren't. They had a lot of competitive organizations of equal size. I think that creates a better competitive and collaborative environment than having a huge, huge set of actors and [lots of] little people" (Interview with Mark Pisano, 2009).

It should be emphasized that the Bay Area, like any complex metropolitan region, does not build coalitions easily or automatically. Sean Randolph, the President of the Bay Area Council Economic Institute, says that fragmentation makes it "very, very difficult to get direction or consensus or any kind of joint action or planning at the metropolitan level with

all these jurisdictions typically riding in different directions" (Randolph, 2009). And yet, the Bay Area has nothing like LA County, where all of its sub-regions were either 'all in' or 'all out'; a lack of intra-regional consensus meant they were 'all out'.

SAVE THE BAY

Concurrent with the Bay Area's experience of learning how to assemble a cross-jurisdictional coalition for regional rail transit, the natural geography of the Bay Area encouraged another region-wide policy innovation. The history of the Save-the-Bay movement is well known, and will be briefly analyze here for what it reveals about the role of first nature geography in catalysing cross-realm coordination in the Bay Area.

In 1959, the US Army Corps of Engineers published a study which showed that if the 1940 to 1957 rate of infill of 3.6 square miles per year continued, the Bay would be reduced to a channel within 100 years (Berke, 1983:490). In response to this, a citizens group known as the 'Save San Francisco Bay Association' was set up in 1960, led by three East Bay women, among whom was the spouse of the president of the University of California system. Save the Bay grew to have thousands of members in a short period of time, and began a campaign to convince the public that the problem of filling the Bay was a regional one (Berke, 1983: 490). The Institute of Government Studies of the University of California-Berkeley responded by publishing a more extensive report in 1963, entitled "The Future of San Francisco Bay" (Scott, 1963; cited by Berke, 1983:491). Save the Bay organized a legislative campaign, culminating in Senate Bill 14, which set up the San Francisco Bay Study Commission, composed of nine board members representing each of the nine Bay Area Counties. The SFBSC was tasked with preparing a report on how to balance the public interests of the Bay with economic interests. The 1965 report to the legislature recommended

setting up the San Francisco Bay Conservation and Development Commission (BCDC). The 1965 McAteer-Pettris Act set up BCDC as a temporary agency with the power to approve or reject proposals to fill in the Bay. Following the first Bay Plan, BCDC was made permanent by the California legislature in 1969. Since then Bay fill diminished substantially, even registering a small net gain in the size of the Bay by 2012 through tidal marsh restoration. Thanks to conditionality in development permits public shoreline access has increased from four miles in 1969 to 200 miles today (Save the Bay, 2012). BCDC was effectively the first coastal zone management agency in the US.

The Save the Bay movement was an important social learning experience in the Bay Area. In the words of Dorothy Ward Erskine, the founder of People for Open Space, which later became the Greenbelt Alliance:

> "Fighting these battles you begin to develop a sense of team with different new people willing to join. And the effect upon the individual in doing this is really extraordinary… People completely change under the effort to do these things" (Dorothy Ward Erskine , cited by Walker and Cronon, 2008-p. 187).

In other words, by the 1960s the Bay Area faced a number of governance challenges, and responded to them with regional coalitions and compromises, leading to collective action. The campaigns to build support for these measures appear to have resulted in the acquisition of regional perspective and experience by a variety of citizens, organizations and local governments.

LA's ORGANIZATIONAL FABRIC

In the late 1980s and 1990s, evidence of a change in regionalist capabilities could be seen in Southern California. Following decades of failure to reach consensus on regional transportation priorities, regional business and political leaders began to realize that deadlock was resulting in the region's failure to obtain federal funds (Wachs, 1996:137). In 1980 Proposition A was put forward by the Los Angeles County Transportation Commission to fund the completion of the four-pronged transportation plan of the late 1970s. This plan included the Red line (a heavy rail starter line), the Blue line (the light rail to Long Beach), express buses on car-pool lanes and ride-sharing (Wachs, 1996:138). The carefully designed and marketed proposition to raise a half cent sales tax gained wide-ranging appeal and was passed in 1980, unlike the 6 previous attempts, "and Los Angeles was finally able to mobilize for the construction of a rail transit system" (Wachs, 1996:138). California voters approved a state-wide gasoline tax in 1990, which together with bond measures and the approval by county voters in 1990 to double the local transit sales tax saw the transit plan grow to include Metrolink, the suburban commuter rail service, amongst other plans such as bus electrification and HOV lanes on highways, all together worth $180 Billion over the subsequent 30 years.

> "From being unable to reach consensus on a single rail project prior to 1970, the Los Angeles region has again turned transportation politics on its head and is now pursuing the most vigorous transit capital investment program of any metropolitan area in the country, perhaps in the world" (Wachs, 1996:138).

The Alameda corridor, a 20-mile rail corridor connecting the ports of LA and Long beach with continental railroad mainlines near downtown Los Angeles, proposed by SCAG

in the early 1980s (Hicks, 2008), was built in the 1990s and began operating in 2002. In this respect, Southern California in the 1990s, at least its metropolitan core, began to look more like the Bay Area in the 1960s. Accompanying this apparent change in regional sentiments, Southern California began developing in earnest a fabric of community-based organizations.

The divergence between LA and the Bay Area's civic spheres were discussed above in context of the Bay Area's environmental movement which culminated in the free-speech and anti-war movements in the 1960s. Another traceable strand of divergent civic development with an impact on the degree of cross-realm relations and widely-shared beliefs is evident in the two regions' early business-labor relations, as early as the first decade of the 20th Century. LA's corporate-political alliance successfully crushed Southern California's labor movement around 1910, giving the 'open shop' new life for a subsequent three decades "and the industrialisation of LA was placed even more firmly in the hands of business interests linked to the triumphant LA times and the powerful merchants and manufacturers association" (Scott and Soja, 2008-p. 7).

A similar attempt by business leaders to dominate the San Francisco area (through the San Francisco Chamber of Commerce and related organizations - namely the Merchant's Association, the Downtown Association and the board of trade) however failed to crush the labor movements as their LA counterparts had done in Southern California. Religious organizations (namely Catholics and Jews) had given the labor movement legitimacy, and "[b]usiness did not simply, and without conflict, impose its monopolistic will upon the community… San Franciscans challenged the presumption of organized business to be fair and accurate in representing the public interests… the city's political culture imposed limits on business legitimacy" (Issel, 1989-p. 7). San Franciscans' political culture was rooted in conceptions of workers' control, 'equity in the workplace' and religious beliefs in the 'dignity

of labour'. "Chamber of Commerce leaders thus had to contend with a political culture that posed limits to the legitimacy of unilateral business power, proposed instead a model of shared governance and policy-making based on the principle of equal participation by the white working class" (Issel, 1989-p. 57). These early developments in business-labor relations had long-lasting effects on beliefs and corporate-civic relations over the course of the 20th Century.

Until the early 1980s Los Angeles' conservative business elites had thus exerted a firm hold on city politics and successfully subdued progressive and labor movements since the early 20th century, arguably contributing to the Watts riots of 1965 and the Rodney King riots of 1992. Economic restructuring in the 1970s and 1980s brought a wave of mergers, acquisitions and closures of many Fortune 500 firms whose headquarters were based in LA, and whose leaders had constituted "the oligarchy of the downtown business interests" (Frank and Wong, 2004, cited by Montgomery, 2011). Seizing this emerging power vacuum, several business groups and social movements began to organize in the region.

These movements have very different objectives. On one side are residential developers, and a loose coalition of homeowner associations and businesses in the San Fernando Valley who attempted but failed to secede from the city of Los Angeles in 2002. More generally, homeowner and neighbourhood associations have become more active in Southern California, and are often hostile to land development that would raise densities, and are wary of developer influence over city councils. On the other side can be found "a network of progressive labor unions, community organizations, and environmental groups" (Dreier, Mollenkopf and Swanstrom, 2001).

The rise of community and labor movements is particularly interesting, as it has some parallel to the earlier and more intense rise of community activism in the Bay Area. Instead of environmentalism as the key uniting feature of these movements, however, in Los Angeles County it is social justice issues. Beginning with the regional economic downturn of the early 1990s, and culminating in the 1992 Rodney King riots, Southern California has undergone a demographic shift. It has a higher proportion of immigrants than the Bay Area, and its immigrants are composed to a much greater extent of less-educated and lower-skilled workers. In the context of declining capital-intensive manufacturing and a visible rise in low-wage employment, Southern California began to show a change in organizational complexion in the 1990s, with a major push for increased unionization (Milkman, 2006). At a time when unionization rates were declining in the US as a whole, they were on the rise in Los Angeles (Soja, 2010: 127). This was in no small part due to the unionization of immigrants, many of them working in service industries and the public sector, while private sector membership followed the national trend of continued decline. Los Angeles has higher public sector unionization rates compared to San Francisco.

In this context, by 2001-2002, the historic gap in union density between the cities of LA and San Francisco had narrowed to less than half a percentage point: 16.9% for the Bay Area and 16.5% for Los Angeles" (Laslett, 2008). Therefore, argues Laslett:

> "it stands to reason that [public sector employees'] political influence, and the ability of unions such as SEIU to mobilize them at election time, is greater in Southern California than it is in San Francisco. This difference is the basic reason for the superior degree of political influence possessed by the labor movement in Los Angeles… it is this factor, more than any other, which has enabled the LA unions to catch up with their counterparts in San Francisco" (Laslett, 2008-p. 8).

Unionization appears, in some ways, as the starting point for organizational coalitions interested in region-wide public policy issues, much in the same way that environmentalism has done in the Bay Area. Thus, in 1989, a Bus Riders Union (a labor movement rather than a union) was organized by the Labor/Community strategy Centre, and it organized a successful campaign to re-direct transit expenditures from rail to buses, arguing that a greater benefit for the low-waged would be achieved with this type of transit mix. Another campaign, known as Justice for Janitors, called public attention to low wages for building maintenance workers hired by private companies, under subcontract to major building owners. Since many such buildings are government-owned, the campaign was able to persuade local government to revise the contracts. A similar logic operated in the so-called "living wage campaign": unions and community activists succeeded in getting local governments to enforce higher minimum wages for direct public employees, but perhaps most importantly, in industries with fixed locations (such as hotels), in return for authorization to build. The Alameda Corridor Jobs Coalition took advantage of public debate over the building of the Alameda Corridor rail link between the ports and the main railroad switchyards in central Los Angeles, to attach wage conditions and secure promises for workforce training; the Figueroa Corridor Coalition for Economic Justice that mobilized around the proposed developments along a 2.5 mile Figueroa Corridor between USC and LA's downtown convention center to secure various conditions desired by the local neighbourhoods; the LAX Coalition for Economic, Environmental and Social justice successfully negotiated a Community benefits Agreement in November 2004 with the Los Angeles World Airports that included workforce training, wage, employee benefit, and local hiring quotas. The coalitions behind these social justice and environmental initiatives, described by Manuel pastor as "thick coalitions" in the sense that they represent longer-term repeated interactions (Pastor, 2010:253), drew support from historically fragmented labor,

environmental and community-based groups (Montgomery, 2011; Pastor et al, 2009; Brodkin, 2007, 2009; Pulido, 1996).

In their analysis of the labor movement in the US since 1990, Hurd, Milkman and Turner argue that in addition coalition building has been central to the revitalization of the American labor movement, spearheaded by large labor unions and local activist networks "typically led by 'bridge builders' with interests, contacts and backgrounds that extend beyond the labor movement" (Brecher and Costello, 1990; Rose 2000; cited by Hurd et al, 2003:9). The two most prominent and widely recognized coalition-building organizations in Los Angeles were the Los Angeles Alliance for a New Economy (LAANE) and Strategic Actions for a Just Economy (SAJE), two organizations with strong links to union locals in Los Angeles.

Despite these recent success stories and the rise in LA union membership, it is still early days to judge the extent to which LA's civic mobilization efforts will develop to the same extent as the environmental movement in its breadth and impact. Consistent with evidence presented in a subsequent chapter, the Bay Area's non-profit sector has been about double that of LA's in terms of population-adjusted number of organizations and per capita total assets and revenues since 1990, and the gap has not narrowed since then. In some notable sectors the gap in total assets and revenues per capita has even widened over the past two decades; despite LA's catch-up in union-membership for example, total assets per capita have diverged between 1995 and 2005, as you can see in table 30 below. Back in 1995, Bay Area unions had $24 more per capita total assets than their counterparts in Southern California. By 2000 the gap had grown to $30 more labor union assets per capita in the Bay Area, and by 2005 the gap had increased further to $40 per capita. According to these figures LA's labor union sector is not catching up with the Bay Area's.

Table 30: *Total and per capita labor union assets, Bay Area versus LA, 1995, 2000 and 2010*

J40-Labor Unions	LA Total assets	LA Total assets per capita	SF Total assets	SF Total Assets per Capita	Diff. (LA-SF) per capita
1995	486,000,000	29	369,000,000	53	-24
2000	636,000,000	37	472,000,000	67	-30
2005	1,030,000,000	61	704,000,000	101	-40

Source: Author's calculations using NCCS 'Other' 501 (c)3 database, sum of total assets for NTEECC=J40 (Labor Unions)

At the time of this writing, the scope of coalitions who address issues of regional governance and development is changing rapidly, and the experiences described above are so recent that there exists no rigorous evidentiary base as to their size, effectiveness and durability. They are most developed in Los Angeles County, with a few examples arising in Ventura, San Bernardino and Riverside Counties, and – as would be expected – relatively lower densities in Orange County, with its more conservative political make-up. As a consequence, there seems to be little ability to build coalitions across county lines and the relationships between more elite leadership and these union-movement groups, appear weak (Imbroscio, 2009). This may reflect the natural propensity of business leadership to be less fond of labor issues than it might be of environmental protection, but it may also reflect differences in the composition of business leadership in the two regions. The Bay Area has more large corporate headquarters than does Los Angeles, and Southern California has been losing its headquarters, perhaps making it more difficult to generate civic involvement of the corporate sector in Southern California. And, as will become evident through network analysis, networks within the corporate elite by 1995 and 2010 are less dense and more fragmented in Southern California than in the Bay Area. There is thus good reason to believe that the vertical coalition found in the Bay Area, between community groups, different social

classes, business elites, and different geographical areas, still has no equivalent in Southern California.

SUMMARY – PART III

The two chapters comprising Part III of this study were designed to investigate the 'regional effect' hypothesis, which claims that the Bay Area's transposition-enabling socio-relational context can be traced back to historical developments in the region's civic and political/cross-jurisdictional spheres. Chapter 6 began by reviewing the genesis of the IT industry's unique socio-relational context, which itself emerged from the transposition of the cyber culture with roots in military research circles and the region's widely-shared counterculture. The second part of Chapter 6 briefly traced the Bay Area's environmental movement from the founding of the Sierra club in the last decade of the 19th Century to the early 1980s, showing that its dynamic nature involved numerous cross-realm relations that cut across social, economic and jurisdictional boundaries, akin to a transposition-enabling socio-relational context.

Chapter 7 shifted the scope of analysis from the civic sphere to the cross-jurisdictional political sphere. The chapter compared and contrasted the two regions' propensities for cross-jurisdictional coordination around major regional projects and initiatives. The analysis showed that the two regions' capacities for implementing large scale projects and initiatives diverged by the mid-1900s, by which time such projects required a much greater degree of cross-jurisdictional coordination. Despite the herculean challenge of achieving such coordination in both regions, the analysis showed that the Bay Area developed a greater propensity for cross-jurisdictional coordination because of three structural features: Its first

natural geography, its relative stage of physical development, and paradoxically its highly-fragmented albeit comparably-sized jurisdictional make-up.

A transposition-enabling socio-relational context is thus arguably detectable at the scope of the Bay Area's cross-jurisdictional political landscape, enabled by these three natural, economic and political regional characteristics. Just as research in Part II offered trace evidence of a transposition-enabling socio-relational context at the scope of the Bay Area's high-end corporate social structure and possibly society-wide throughout the 1980 to 2010 period, the analysis here offers trace evidence of a possible transposition-enabling socio-relational context at the scope of the Bay Area's civic and cross-jurisdictional political realms since at least as far back as the mid-1900s. Together these pieces of evidence show that the Bay Area's transposition-enabling socio-relational context is detectable at a broader scope than those typically analyzed in the literature. The various findings in Parts II and III offer some evidence that such a socio-relational context operates at the high-end corporate social structure, possibly society at large, and can be traced back in history to region's civic and cross-jurisdictional political realms. As will be argued in the concluding section that follows, these findings offer support to the 'regional-effect' hypothesis, which attributes the socio-technological trajectory of the Bay Area's IT industry and broader industrial structure to a regional transposition-enabling socio-relational context. This might explain why so-called 'accidents of history' or 'luck' in the Bay Area developed into the thriving IT industry but not in other regions with similar 'historical events'; in the Bay Area they seem to have landed in a fertile socio-relational terrain.

PART IV – REGIONAL EFFECT: SEEDS LANDED IN FERTILE GROUND

CHAPTER 8: LOOKING BACK AND LOOKING FORWARD

TRIANGULATING FROM THE VARIOUS FINDINGS

Since the 1980s the secret of Silicon Valley has been the subject of intense research in diverse fields such as economic geography, institutional sociology, organizational theory and industrial economics. Research has highlighted the critical role played by a sequence of important events in the region's economic history and characteristics of its industrial structure in explaining its highly innovative and entrepreneurial economy. Studies have highlighted specific technological innovations (such as the micro-processor, power-grid tubes and microwave tubes), the role of 'genius' scientists and engineers (such as Shockley and the 'traitorous eight'), evolutionary industrial processes and corporate strategies (such as spin-offs, joint ventures and institutional brokers such as universities, VCs, lawyers and dealmakers), well-timed strategic initiatives (such as Bell Labs and its government-enforced symposium to share knowledge on semiconductors, the Stanford Science Park, and the founding of the Palo Alto Research Center - PARC), and cultural characteristics (such as the cyber-counterculture transposition or attitudes towards risk, failure and experimentation). Each of these various accounts offers an important dimension of the 'story' of the San Francisco Bay Area's economic miracle over the past three decades (Kenney and Von Burg, 2001; Kenney, 2000; Saxenian, 1983, 1990, 1996; Suchman, 2000; Kenney and Florida, 2000). This study offers an additional perspective, one that takes into account the broader transposition-enabling socio-relational context of the Bay Area region as a whole.

Transposition is a theoretical concept developed by institutional sociologists to describe the dynamic process behind institutional genesis, whereby actors from distinct

communities with distinct ‘bundles’ of conventions and relations learn to coordinate and cooperate across realms in pursuit of new collective goals. By crossing boundaries and forming new on-going relations these actors develop hybrid institutional forms, from new organizational forms (such as start-ups, spin-offs and R&D operations) to institutional domains (such as new industrial clusters), spawning innovative prototypes and products (better and entirely-new objects) (Padgett, 2005-p. 5). The institutional characteristics behind transposition are cross-realm relations (which imply diversity of actors from different realms, and the catalytic role of an anchor tenant or ‘broker’ who facilitates cross-realm relations) (Padgett, 2005; Powell et al, 2010) and ‘cognitive overlap’ or ‘compatibility of world views’ which facilitates communication and relations across domains (Denzau and North, 1994; North, 2005). This theoretical model from institutional theory is consistent with research on the Bay Area’s industrial structure, which emphasises the role of ‘networks and culture’ within the region’s IT industry (Saxenian, 1996), dealmakers in the regional entrepreneurial economy (Feldman and Zoller, 2012), and brokered cross-realm relations in the biotechnology industry (Powell et al, 2010).

Evolutionary economists emphasize the co-evolution of various societal spheres and their impact on economic development. Freeman (1995) argues that the study of economic development must shed light on the autonomous evolution of and interactions between the spheres of science, technology, economics, politics and culture in order to understand the three dynamics of economic development: Forging ahead, catching up and falling behind (Freeman, 1995-p. 16). This study has inadvertently followed part of Freeman’s recommendation by exploring the autonomous evolution of the political/cross-jurisdictional and civic spheres, and evaluated their joint impact on the socio-relational context in which the IT industry emerged and evolved.

Neither theoretically-derived major income growth-related characteristics nor the specific events and 'accidents of history' can satisfactorily explain the emergence and development of one of the world's most innovative, entrepreneurial and resilient industrial structures of the 21st Century. The analysis in Part I argued that the Bay Area's extraordinary income growth was driven by the evolution of the industrial structure and its increasingly large education premium, and that none of the major income-growth related characteristics could explain such industrial dynamics nor the extent of the 1980 to 2010 income growth. Likewise, the widely-recognized events which led to the Bay Area's economic success also cannot satisfactorily explain the evolution of its industrial structure, because similar events have taken place in other regions, without equivalent economic consequences.

Many regions for instance have played host to 'innovative tenants', both 'individual geniuses' and large corporations, without developing highly successful clusters; such as Motorola locating the world's first and largest semiconductor facility in Phoenix in the 1950s (Scott, 1987). At the international level some countries such as many in the European Union have a "comparatively limited capacity to convert scientific breakthroughs and technological achievements into industrial and commercial success" (European Commission, 1994 – cited by Casper and Van Waarden, 2005-p. 7). Notable inventions, innovations and innovative tenants cannot explain why some regions build on these initial accidents of history to develop highly dynamic industrial structures, while others do not. Furthermore "the clustering of high-technology firms into 'science regions' around universities was notable throughout the country, and yet no other regions experienced Silicon Valley-style transformation in the decades hence" (Moore and Davis, 2001-p. 11). Likewise Stanford University "was not alone in setting up an Industrial Park and attempting to directly bring firms to the university community" (Moore and Davis, 2001-p. 11).

Moreover, these early 'innovative tenants' and initiatives cannot explain why the Bay Area was able to innovate its way out of maturing product and industry life cycles since the 1970s, such as the commoditization of semiconductors by the Japanese in the early 1980s which cost the region around 30,000 jobs in local chip manufacturers and related sectors between 1984 and 1986 (Saxenian, 1983, 1990). Nor can it explain how the region's industrial structure branched out from one technological wave to the next, initially specialized in semiconductors and eventually branching out into software, disk drives, networking hardware and other components (Saxenian, 1990).

The story of the Bay Area's evolving industrial structure is one of invention; the invention of new products, markets, firms, institutional arrangements, relationship, financing arrangements and management practices. These inventions cannot be attributed to any single individual 'genius', just as "'invention in the wild' cannot be understood through abstracting away from concrete social context, because inventions are permutations of that context" (Hutchins 1995, Latour 1988, Galison 1997 – cited by Padgett, 2005-p. 3). The 'regional effect' hypothesis thus claims that the Bay Area offered a concrete social context which facilitated the recombinant process of transposition and consequent innovations and inventions characteristic of its industrial structure. Such a concrete social context, referred to here as a transposition-enabling socio-relational context, enabled the combination and re-combination of a critical mass of people, firms and institutions to absorb and develop new knowledge, develop ideas and prototypes, and commercialize them for lucrative commercial ends. In so doing the regional industrial structure overcame the maturing of products and industries by continuously inventing, innovating and commercializing new products, companies, and supportive high-end services.

This is exactly what happened in the 1980s when the industry for microchips matured, the knowledge became codified and imitated by the Japanese, and the maturing industry had migrated from its experimental roots into mass-production hierarchies (Saxenian, 1990). The window of locational opportunity for custom-made semiconductors was exploited in the Bay Area, right 'under the noses' of the maturing 'intellectual world of production'. The region possessed a sufficiently transposition-enabling socio-relational context that an avalanche of transposition and subsequent innovation cascaded in response to the new window of technological opportunity in the mid-1980s for custom-made chips (Saxenian, 1990); and the budding industrial structure continued to innovate, 'branching out' into new industrial trajectories over the subsequent 30 years.

The findings from the various studies in this research do not offer a definitive answer to the 'regional effect' hypothesis, but they do offer several corroborating pieces of evidence which taken together support it. The long and dynamic history of the Bay Area's environmental movement is characterized by cross-domain relations and the involvement of regional elites. Dynamic activism and coalition-building across geographic and social/class boundaries since the very beginning of the 20th Century culminated in a widely shared environmental consciousness in the Bay Area. The fact that the Bay Area became a national and even global poster-child for environmental activism attests to the extent of cross-cutting networks and widely-shared environmental consciousness over and above what most regions experienced. The shared ecological belief systems and cross-cutting networks spilled over into the free-speech and anti-war movements of the 1960s, an era of heightened activism in the Bay Area. The stage was set for the cyber-utopian transposition which saw the fusion of two 'logics', the cybernetic vision of a networked non-hierarchical free society, and the utopian vision of world peace, justice, equality and environmental sustainability. This cross-

cultural transposition generated a broader scope of widely shared and highly inspiring belief systems, further enabling cross-realm relations.

Turner's historical account of Stewart Brand's key bridging role between the communalist communities and the high-tech community captures an important and highly-influential strand of history within broader regional socio-relational dynamics. Brand however was in no small part a product of the regional context whose socio-relational trajectory he influenced. Moreover, the catalytic role Brand and others played in shaping the socio-relational context of the IT industry in the Bay Area arguably had the broad and significant impact that it enjoyed because of the concrete context in which it unfolded. The widely-shared belief systems of a counterculture (environmental consciousness, beliefs in free-speech, anti-war sentiments and utopian visions of 'another world') and the cross-realm relations that accompanied its emergence over the course of the 20th Century (as exemplified by the environmental movement) shaped Brand's belief systems and offered a concrete social context which acted as 'fertile ground' for his and others' actions, visions and cross-domain brokering initiatives to have the impact that they had, including their influence on the genesis of the IT industry and its subsequent socio-technological trajectory..

Therefore the evolution from 'counterculture to cyberculture' and its consequent impact on the socio-technological trajectory of the IT industry in the Bay Area cannot be de-contextualized from its concrete social context – one that developed over six or seven decades of environmental and other civic activism in the Bay Area region, culminating in the region's transposition-enabling socio-relational context which acted as 'fertile ground' for the counterculture to cyberculture evolution, and the consequent emergence of a transposition-enabling socio-relational context at the scope of the IT industry in particular and the broader industrial structure in general.

Twenty to thirty years earlier, in the mid-1900s, cross-realm relations and widely-shared perceptions were forged around strategies for responding to the Bay Area's transit challenges. Just as cross-jurisdictional divisions had plagued efforts to develop a regional transit system in Southern California, deep divisions emerged across jurisdictional lines in the Bay Area, such as between rival business leaders in San Francisco and Oakland. Over time however many of these divisions were overcome by the necessity to cross the Bay, and by the region's comparatively even-sized jurisdictions which allowed for some counties to opt-out of the project without jeopardizing it outright. While the Bay played a paradoxically uniting role between East Bay and San Francisco business and political communities by dint of its separating characteristic, it also played a galvanizing role in uniting people from across communities surrounding it in efforts to save it. The Bay Area Council which was founded in 1944 to represent the interests of the region's business community has since its inception played an influential bridging role across the corporate sector, and broader regional interests. It supported both BART and 'Save the Bay' for example, and in 1965 it sponsored legislation that created BCDC. While cross-realm relations and widely-shared belief systems were emerging from cross-cutting activism in the environmental sphere since the last decade of the 19th Century, they were also being forged by the necessity to overcome regional transportation challenges and the need to 'save the Bay' in the 1950s and '60s.

By the 1980s the Bay Area region had inherited cross-cutting networks and widely-shared belief systems that spanned across intra-regional community boundaries. The region was thus endowed with a transposition-enabling socio-relational infrastructure partly-inherited from historical developments, social learning and coalition-building in its civic and political/cross-jurisdictional spheres. The regional socio-relational context was also detected at the broader scale of society at large, evident by relatively high levels of generalized trust

and a vibrant civil society. With over eighty years of dynamic civic activism and cross-cutting mobilizations, from the environmental movement to the free-speech and anti-war movements, the region had developed a civic sphere that was twice the relative size of LA's, attesting to its dynamic and cross-cutting historical legacy.

The Bay Area's high-end corporate social structure proved to be resilient to geographic and economic changes, with the rise of new urban cores and new high-tech firms between 1980 and 2010. The 'old' corporate social structure centred around San Francisco and Oakland up until 1995, fragmented almost entirely between 1995 and 2010, to be entirely replaced by new relations between the 'old' San Francisco corporate leadership and new high-tech leaders in new urban cores in Silicon Valley. With the Bay Area Council playing the role of a centrally-positioned and well-connected anchor tenant within this corporate social network, a consensual perception of globalization, the region's role within it, and the importance of the socio-relational context to regional competitiveness and resilience became widely shared, and proved to be consistent over time. By 1980 the region was thus equipped with a transposition-enabling socio-relational context - detectable at various scopes including the high-end corporate social structure - that enabled people, firms and institutions to combine and recombine highly-effective cross-realm relations for absorbing and developing new knowledge, ideas and prototypes, and successfully commercializing them for lucrative commercial ends.

The story of Southern California however contrasts sharply with that of the Bay Area's. Over the first half of the 20th Century the powerful corporate elite in downtown LA, with its committee of 25, powerful chamber of commerce and the LA times worked with their political partners in developing the region's infrastructure for subsequent population growth (Fogelson, 1967). Unlike the 'old' San Francisco elite however, the LA elite did not develop

the cross-regional ties with the civic sphere in the first half of the 20th Century, nor with new corporate leaders across the region post-1980 – rather geographically and industrially fragmented high-end corporate communities each went their own way, highly distrusting of each other, and considering LA as the 800lb guerrilla on the block. Moreover the region was highly fragmented across ethnic and class-lines, and paradoxically, "[a]lthough LA's growth required the intensive and highly effective use of public power, the metropolis that emerged was strangely bereft of any unifying civic life. Los Angeles was fragmented politically, socially and culturally" (Fogelson,1967-p. xvii).

By the time regional initiatives required cross-jurisdictional coordination in the mid-1900s, LA's hitherto ease at implementing large-scale regional initiatives waned, laying bear its inter-community fault-lines. Unlike the Bay Area, the region did not develop widely-shared belief systems around environmental consciousness, regional transit or any other uniting belief system. The region lacked a unifying galvanizing force such as the Bay, and the disproportionate size of Los Angeles County meant that attempts to develop a regional transit system failed due to intra-county divisions – a modular response such as the one achieved in the Bay Area was not possible. Moreover the nature of the challenges the two regions faced differed in many respects. While many of the Bay Area's challenges were cross-jurisdictional in nature, such as the challenge of crossing the Bay and saving it from in-fill, Southern California's challenges were either LA-centric or perceived as such (the Watts riots of 1965 and later the Rodney King riots in 1992 for example), or resolved with limited coordination (such as pollution/smog). Coordinated action around the region's transportation challenges came much later on, in the early 1990s. While the Bay Area was developing cross-realm relations and widely-shared belief systems around its regional challenges, Southern

California's diverse communities across its sprawling landscape did not bridge cross-realm structural holes early on.

By the time the region faced the challenges and opportunities of globalization, it had lower generalized trust and civic life in society at large, and its LA-centric high-end corporate social network fragmented in the face of the severe economic changes sweeping the region. Lacking a centrally-unifying business-civic organization such as the Bay Area Council, the corporate leadership failed to develop appropriate and widely-shared perceptions of the economic challenges from globalisation and the role of the region with the rapidly changing economic environment. By the 2000s, after three decades of oscillating belief systems and changing priorities, and lacking a widely-shared concrete vision of a high-road industrial trajectory, the corporate leadership regressed to worn-out perceptions of LA as a global hub for international trade and logistics (one evident in the early 1980s with plans for the Alameda corridor, and long abandoned by the corporate leadership in the Bay Area), low-waged light manufacturing, and related fearful attitudes towards globalization, environmental regulation and taxation.

With a fragmented socio-relational infrastructure, and a lack of critical mass of cross-realm relations or widely-shared belief systems, people, firms and institutions in the 1980s and 1990s were incapable of sufficiently mobilizing cross-realm relations in response to emerging economic opportunities. Unlike the Bay Area, Southern California's industrial structure failed to sufficiently absorb, develop and commercialize new knowledge and exploit new opportunities in the 'new' economy. Its industrial structure instead lost its financial cushion from its politically-favoured aerospace industry, and any cyber-utopian visions gained by any of the region's aerospace scientist and engineers emerged in un-fertile socio-relational ground (as no doubt highly-capable engineers in LA must have read books by the

likes of Buckminster Fuller and been inspired by the counterculture-wave sweeping the country), just as the world's largest biotechnology firm, Amgen, had failed to spawn a thriving biotechnology cluster in Southern California. Instead the industrial structure saw the shrinking of its high-waged aerospace sector, and the growth of its relatively low-waged logistics sector, with growth in entertainment insufficient to propel the regional economy down a high-road economic trajectory. Southern California's socio-relational context was arguably 'barren land' to robust action, luck, solitary inventors and other accidents of history.

The evidence from this research thus supports the hypothesis that the Bay Area enjoys a regional transposition-enabling institutional context, whose origins can be traced back to developments and social learning experiences in the region's civic and political/cross-jurisdictional spheres over the course of the 20th Century. These social learning experiences developed cross-cutting relations and widely-shared perceptions and belief systems within which emerged the IT industry in the 1960s and '70s. Over the subsequent three to four decades the IT industry and the broader industrial structure co-evolved with and within the regional transposition-enabling socio-relational context, culminating in the Bay Area's highly innovative and entrepreneurial industrial structure for which it is revered today.

POLICY IMPLICATIONS AND FUTURE RESEARCH

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The findings in this research suggest that in this current era of capitalist development, within the broad socio-political context of Western developed economies, the capacity of regions to absorb and develop knowledge and commercialize new ideas and products successfully is maximized by a socio-relational context characterized by cross-realm relations and widely shared belief systems – such a context in turn maximizes the probability of cross-realm transposition as new relations and conventions are forged in response to new

technological and commercial opportunities. This opens up huge potential for creative policy measures for catalysing cross-realm relations and widely-shared belief systems, and generally supports recent attention and efforts on developing social capital and a thriving civil society (Woolcock and Narayan, 2000).

Policy implications from this research also highlight the well-known lessons from attempts to copy and paste aspects of the Bay Area's experience, such as science parks and university-industry relations for instance, namely their short-comings. The Bay Area transition into a highly innovative and entrepreneurial economy specialized in IT occurred at a specific juncture in the evolution of the technological trajectory of the IT industry, within a specific socio-relational context. Taking any single aspect and decontextualizing it in an attempt to re-produce its original effects is unlikely to be fruitful in and of itself.

The research highlights the co-evolution of technology, industry and the broader socio-relational context. Moreover the regional socio-relational context can either act as an impediment or catalyst to the development of technological and industrial trajectories, by determining the probability and consequently the degree to which new knowledge is absorbed, developed and commercialized successfully. Therefore in addition to the well-known prescriptions for regional development, such as education and developing an innovation system, this research suggests focusing attention to the broader socio-relational context as well.

This research raises many questions and implications for future research in numerous areas. The research on directorate interlocks highlights the possibility that although the overall US corporate structure was maintained despite market turbulence and the receding of bank centrality (Mizruchi and Stearns, 1988; Mizruchi, 1996), the impact was more uneven

across regions. The research also showed how the Southern California network fragmented across corporate, industrial and geographic boundaries, but falls short of identifying which relations are driving this fragmentation. Is it the fact that lower propensity to cross industrial boundaries that drives cross-city relations, or vice versa? Future research could investigate the causal sequence of fragmentation across industrial and geographic boundaries in high-end corporate social structures.

The research also raises important questions about the characteristics which determine the propensity for relations and conventions to cross intra-regional boundaries. The galvanizing role of first nature geography and the urgency raised by the relatively advanced stage of physical development, together with the fairly evenly sized jurisdictional landscape were identified as facilitating cross-realm relations and widely-shared perceptions and belief systems in the Bay Area. Research on transposition-enabling factors could focus on specific realms, such as industries for example. Are social relations across industrial boundaries more likely to take place under specific conditions? Are social relations more likely to extend across some industries than others? If so, then why?

The research highlighted the involvement of the Bay Area's corporate leadership in the civic and political/cross-jurisdictional spheres, and their propensity to overcome divisions and form cross-realm coalitions, whether with each other (as in the case of BART) or with communities from other spheres (such as in the environmental movement). This however is merely the tip of the iceberg of the vast social structure in a region, and the cross-realm relations and shared beliefs that connect 'ordinary' people across numerous communities. More research could explore whether the catalyst for cross-realm relations across communities is top-down (i.e. predominantly driven by the leaders across communities) or

bottom-up, or both, and under which conditions. Such insights would elucidate policy attempts to develop cross-realm relations and shared perceptions.

Cross-realm elations and shared beliefs pose a chicken and egg type problem, whereby it is unclear whether one must precede the other. Research could thus attempt to untangle the causal sequence of relations and beliefs to better understand how a critical mass of cross-realm relations emerges in the first instance. Do cross-realm relations generate shared beliefs, or do shared beliefs enable cross-realm relations? Or do interdependencies across communities 'force' them to communicate and coordinate their actions in pursuit of their self-interests? If so there might be scope for policy makers to focus on highlighting or even developing interdependencies across communities as a strategy to encourage cross-realm relations. Furthermore, what role does the media and cultural industries in general (museums, theatre, film, and music) play in developing shared beliefs or conflicting perceptions across intra-regional realms?

This research thus raises these and many other interesting directions for future research. The greatest challenge will be to incorporate the socio-relational dimension in economic thinking and modelling. The challenge is rendered particularly difficult by the specific circumstanced that generate opportunities for the shift in investment and production activities, namely technological opportunities and the socio-relational context in which such opportunities emerge, which consequently shape regional socio-industrial trajectories.

APPENDIX

Appendix 1: Regression variable construction

Income:

The per capita income variable was generated by summing the aggregate CBSA income variable, CBSA_agy_[yr], to generate total CMSA-scale aggregate income, and dividing by total CMSA population to generate a CMSA-scale per capita income variable. The total CMSA population was generated by summing total CBSA population.

Share of income on rent:

The BRR data has a variable called ‘cbsa_mgraphy-[yr]’ which represents the median share of median household income that goes on rent. This variable was used as a proxy for housing costs. To estimate the CMSA-scale share of income on rent the following steps were taken: First, the aggregate CBSA income was multiplied by the median share of household income on rent as an approximation for the total share of income that goes on rent (i.e. total rent at the CBSA scale). These were aggregated up to the CMSA scale by summing them up, yielding total rent at the CMSA scale, then divided by the aggregate CMSA income for an estimated share of CMSA income on rent.

Percent BA or better:

The BRR data variable called cbsa_pbabet_80 represents the percent of the population with a BA degree or better. This figure was aggregated to the CMSA scale through population 25-Plus weighting.

Percent high school or less:

The BRR data variable called cbsa_phsless_80 represents the percent of the population with a high school degree or less. This figure was aggregated to the CMSA scale through population 25-Plus weighting.

Patents per capita:

The BRR data has a variable called pats_80 which is the total number of patents by CBSA. This variable was aggregated to the CMSA scale and divided by the total CMSA population 25-Plus multiplied by 100,000 to yield the variable patents per 100,000 people aged over 25.

Share of employment in manufacturing:

The variable zmfg79 represents the share of employment in manufacturing at the CBSA scale. This variable was multiplied by the total number of employed, emp79, to generate the total number of employed in the manufacturing sector. This variable was aggregated up to the CMSA scale by summing across CBSAs. The total number of employed by CBSA were also aggregated up to the CMSA scale by summing across CBSAs. The total number of workers employed in manufacturing was divided by the total number of employed workers to yield the CMSA share of employed in manufacturing.

Share of employment in FIRE:

The variable zfire79 represents the share of employment in FIRE at the CBSA scale. The same method described above for the share of manufacturing was used to generate the share of employment in FIRE at the CMSA scale.

Share of population that is Hispanic

The variable cbsa_phis_80 which represents the share of the population that is Hispanic was aggregated through population weighting.

CBSA-CMSA concordance:

The BRR's CBSA-scale data is almost a perfect fit with my CMSA-scale 5-County LA region and 10-County SF region. The LA region in fact is a perfect fit, as the CBSAs making up the Los Angeles CMSA are composed exclusively of the 5 Southern California Counties. Bay Area counties within the CBSAs comprising the San Francisco CMSA are almost a perfect fit with the region's 10 Counties, as they include all 10 Counties plus one, San Benito, with a population of around 55,000 in 2013. In light of its very small share of regional population (about 0.7%), its inclusion in my analysis does not bias my results. Table A1 below shows the County-CBSA-CMSA concordance[18].

Table A1: *County-CBSA-CMSA concordance, LA and the Bay Area.*

LOS ANGELES METROPOLITAN REGION

5-COUNTIES	**CBSA-NAME**	**CMSA-NAME**
Orange CA	Los Angeles-Long Beach-Santa Ana, CA Metropolitan Statistical Area	Los Angeles-Riverside-Orange County, CA (C)
Los Angeles CA	Los Angeles-Long Beach-Santa Ana, CA Metropolitan Statistical Area	Los Angeles-Riverside-Orange County, CA (C)

[18] The CBSA to CMSA concordance was conducted using the Mable/Geocorr2K geographic correspondence engine from the Missouri Census Data Centre available online: http://mcdc2.missouri.edu/websas/geocorr2k.html.

Ventura CA	Oxnard-Thousand Oaks-Ventura, CA Metropolitan Statistical Area	Los Angeles-Riverside-Orange County, CA (C)
Riverside CA	Riverside-San Bernardino-Ontario, CA Metropolitan Statistical Area	Los Angeles-Riverside-Orange County, CA (C)
San Bernardino CA	Riverside-San Bernardino-Ontario, CA Metropolitan Statistical Area	Los Angeles-Riverside-Orange County, CA (C)

BAY AREA METROPOLITAN REGION

10-COUNTIES+ 1 (SAN BENITO)	**CBSA-NAME**	**CMSA-NAME**
San Francisco CA	San Francisco-Oakland-Fremont, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Contra Costa CA	San Francisco-Oakland-Fremont, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Alameda CA	San Francisco-Oakland-Fremont, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
San Mateo CA	San Francisco-Oakland-Fremont, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Marin CA	San Francisco-Oakland-Fremont, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Santa Clara CA	San Jose-Sunnyvale-Santa Clara, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Napa CA	Napa, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Santa Cruz CA	Santa Cruz-Watsonville, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Sonoma CA	Santa Rosa-Petaluma, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)
Solano CA	Vallejo-Fairfield, CA Metropolitan Statistical Area	San Francisco-Oakland-San Jose, CA (C)

San Benito CA	San Jose-Sunnyvale-Santa Clara, CA Metropolitan Statistical Area	Non-metro

Source: Mable/Geocorr2K COUNTY-CBSA-CMSA Concordance

As shown in the above concordance between Counties, MSA/CMSAs and CBSAs, the only discrepancy is the County of San Benito in the Bay Area. With a very small population of 55,000 in 2010, San Benito is very small and therefore does not bias the Bay Area regional data in any meaningful way. Of course removing it from the data would have been unfeasible, as it is part of the San Jose-Sunnyvale-Santa Clara CBSA. The BRR data was thus deemed sufficiently appropriate for my analysis.

Appendix 2: Sampling method and data sources for network analysis

Network analysis of sampled firms followed a three-step process. In the first step corporations were ranked by total revenues in each of the three cross-sections. In the second step the names of their directors were copied from each corporation's 10K or annual report (in most cases the 10 K was used a source, and when this was not available, the annual report was used). The third step involved cleaning the data by insuring that the names of directors were spelled identically for UCINET, the network analysis program used, recognized and matched directors across corporations.

Step 1: Building the samples

Firms were ranked by total revenues in each of the three cross-sections using the following data sources:

1980: Dunn's Business Rankings 1982 (Earliest available year with sales ranked by State). As the directory ranks corporations by State rather than region, all the corporations for the

State of California were manually copied into an Excel spread sheet, and sorted by region then by revenues.

1995: Merged data from the Wharton Research data Service (WRDS) and the 1995 Dunn's Business Rankings – both available online through free subscription. These two data sources had some discrepancies, with some corporations found in one database but not the other. Thus an aggregated list was merged and sorted by total revenues for a final 1995 sample of the largest corporations.

2010: The Dunn and Brad Street 2010 Million Dollar Directory (MDD) and Morningstar Inc (10K Wizard database). These two data sources also yielded some discrepancies and were thus merged to generate a sample of the largest corporations by total revenues in2010. The D&B Million Dollar Directory was available online through the Los Angeles Public Library, and the 10K Wizard database was available through [aid subscription to Morningstar Inc.

Step 2: Building the database of directors' names

The names of the directors were extracted from each corporation's 10K, through the following sources:

1980: An RA was hired to scan relevant pages (the front page to prove the correct report was identified, and the pages listing the names of the directors) in the 1981 or 1982 10Ks or annual reports of each of the sampled corporations from the Stanford University Jackson Library archive. The names of each director was then copied and pasted into an Excel spread sheet.

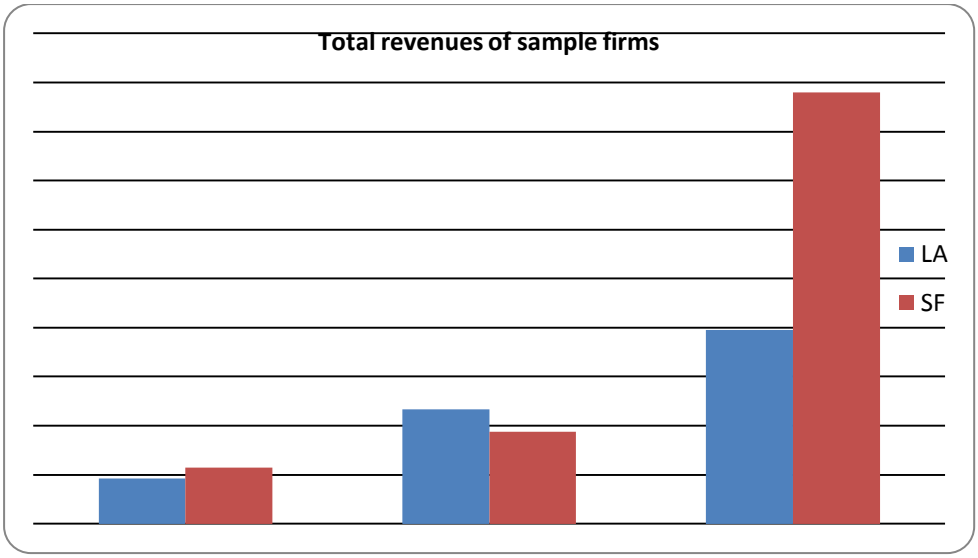
1995 and 2010: The 10Ks of each sampled corporation was downloaded from the Edgar database (available free online from the Securities and Exchange Commission). Names were extracted from these 10Ks and pasted into the spread sheet of directors' names.

Step 3: In addition to the directors' names, the spread sheet of sampled corporations also included the total revenues, principle 4-digit SIC Industry Classification Codes, the city of the headquarters. The data was 'cleaned' by insuring that the names were identically spelled. The rule used to match small discrepancies in middle-names was as follows: if a name was John L. McCormick in one 10K and John L. McCormick in another 10K, the names were assumed to be the same and changed to the long version. In the case that two identical names differed because one of them was preceded by Jnr. or Snr., the name was checked through additional internet search of the name and the corporations.

Below is the total number of firms included in each cross section of sampled corporations:

Year	Region	No. Of FIRMS
1980	LA	70
1980	SF	70
1995	LA	60
1995	SF	60
2010	LA	63
2010	SF	63

Below are the total revenues of sampled firms in each year:



Note: the big jump in SF is attributed to 3 firms asfollows:

	1995	2010
_FIRM_CHEVRON_CORP____1	3,100,000,000	171,000,000,000
_FIRM_HEWLETT_PACKARD_CO___2	25,000,000,000	120,000,000,000
_FIRM_MCKESSON_CORP____3	12,000,000,000	110,000,000,000

Appendix 3: Number, percentage and cumulative percentage of firms in LA and the Bay Area cities, 1980, 1995 and 2010.

1980:

LA CITIES	# Firms	%	Cum %
LOS_ANGELES_	38	54%	54%
PASADENA__	3	4%	59%
BEVERLY_HILLS_	3	4%	63%
SANTA_MONICA_	3	4%	67%
EL_SEGUNDO_	2	3%	70%
FULLERTON__	2	3%	73%
IRVINE__	1	1%	74%
TORRANCE__	1	1%	76%

SF CITIES	# Firms	%	Cum %
SAN_FRANCISCO	27	39%	39%
OAKLAND__	7	10%	49%
SANTA_CLARA	6	9%	57%
PALO_ALTO_	6	9%	66%
SUNNYVALE__	4	6%	71%
CUPERTINO__	4	6%	77%
MENLO_PARK_	4	6%	83%
SAN_JOSE_	3	4%	87%

GLENDALE__	1	1%	77%
ROSEMEAD__	1	1%	79%
BURBANK__	1	1%	80%
LAKE_FOREST_	1	1%	81%
ANAHEIM__	1	1%	83%
LA_HABRA_	1	1%	84%
ORANGE__	1	1%	86%
ALHAMBRA__	1	1%	87%
HAWTHORNE__	1	1%	89%
HOLLYWOOD__	1	1%	90%
LAKEWOOD__	1	1%	91%
LA_MIRADA_	1	1%	93%
LYNWOOD__	1	1%	94%
MONTEREY_PARK_	1	1%	96%
NEWPORT_BEACH_	1	1%	97%
SAN_MARINO_	1	1%	99%
SAN_PEDRO_	1	1%	100%
Total # Firms	**70**		
Total # of Cities	**25**		

SAN_MATEO_	2	3%	90%
WALNUT_CREEK	2	3%	93%
PLEASANTON	1	1%	94%
CONCORD__	1	1%	96%
CORTE_MADERA	1	1%	97%
LARKSPUR__	1	1%	99%
RICHMOND__	1	1%	100%
Total # Firms	**70**		
Total # of Cities	**15**		

1995:

LA CITIES	**#**	**%**	**Cum. %**
LOS_ANGELES_	15	25 %	25%
IRVINE__	4	7%	32%
WOODLAND_HILLS	4	7%	38%
CALABASAS__	3	5%	43%
PASADENA__	2	3%	47%
EL_SEGUNDO_	2	3%	50%
SANTA_ANA_	2	3%	53%
THOUSAND_OAKS	2	3%	57%
ROSEMEAD__	2	3%	60%
WESTLAKE_VILLAGE	2	3%	63%

BAY AREA CITIES	**#**	**%**	**Cum. %**
SAN_FRANCISCO	18	30 %	30%
SAN_JOSE_	6	10 %	40%
SANTA_CLARA_	5	8%	48%
OAKLAND__	4	7%	55%
MILPITAS__	3	5%	60%
SUNNYVALE__	2	3%	63%
PALO_ALTO_	2	3%	67%
CUPERTINO__	2	3%	70%
SAN_MATEO_	2	3%	73%
PLEASANTON__	2	3%	77%

IRWINDALE__	2	3%	67%
TORRANCE__	1	2%	68%
FOOTHILL_RANCH_	1	2%	70%
BEVERLY_HILLS_	1	2%	72%
FULLERTON__	1	2%	73%
BURBANK__	1	2%	75%
COLTON__	1	2%	77%
LAKE_FOREST_	1	2%	78%
RIVERSIDE__	1	2%	80%
LA_HABRA_	1	2%	82%
ORANGE__	1	2%	83%
ARCADIA__	1	2%	85%
CHATSWORTH__	1	2%	87%
COMPTON__	1	2%	88%
COSTA_MESA_	1	2%	90%
CTY_OF_CMMRCE	1	2%	92%
CYPRESS__	1	2%	93%
EL_MONTE_	1	2%	95%
ENCINO__	1	2%	97%
SAN_RAMON_	1	2%	98%
SEAL_BEACH_	1	2%	100%
Total # Firms	**60**		
Total # of Cities	**31**		

MENLO_PARK_	2	3%	80%
EMERVILLE__	2	3%	83%
FREMONT__	1	2%	85%
WALNUT_CREEK_	1	2%	87%
MOUNTAIN_VIEW_	1	2%	88%
REDWOOD_CITY_	1	2%	90%
SOUTH_SAN_FRANCISCO	1	2%	92%
SAN_RAFAEL_	1	2%	93%
SAN_RAMON_	1	2%	95%
BRISBANE__	1	2%	97%
NEWARK__	1	2%	98%
WATSONVILLE__	1	2%	100%
Total # Firms	**60**		
Total # of Cities	**22**		

2010:

LA CITIES	**#**	**%**	**Cum. %**
LOS_ANGELES_	12	19%	19%
IRVINE__	7	11%	30%
PASADENA__	4	6%	37%
EL_SEGUNDO_	4	6%	43%
SANTA_ANA_	3	5%	48%
LONG_BEACH_	3	5%	52%
WOODLAND_HILLS_	2	3%	56%
CALABASAS__	2	3%	59%

BAY AREA CITIES	**#**	**%**	**Cum %**
SAN_FRANCISCO_	11	17%	17%
SAN_JOSE_	11	17%	35%
SANTA_CLARA_	6	10%	44%
SUNNYVALE__	5	8%	52%
MILPITAS__	4	6%	59%
FREMONT__	3	5%	63%
PALO_ALTO_	2	3%	67%
CUPERTINO__	2	3%	70%

THOUSAND_OAKS_	2	3%	62%
TORRANCE__	2	3%	65%
FOOTHILL_RANCH_	2	3%	68%
GLENDALE__	2	3%	71%
ROSEMEAD__	1	2%	73%
WESTLAKE_VILLAGE_	1	2%	75%
BEVERLY_HILLS_	1	2%	76%
FULLERTON__	1	2%	78%
BURBANK__	1	2%	79%
COLTON__	1	2%	81%
LAKE_FOREST_	1	2%	83%
RIVERSIDE__	1	2%	84%
SANTA_MONICA_	1	2%	86%
ANAHEIM__	1	2%	87%
AGUORA_HILLS_	1	2%	89%
COMMERCE__	1	2%	90%
CORONA__	1	2%	92%
HUNTINGTON_BEACH_	1	2%	94%
MANHATTAN_BEACH_	1	2%	95%
PALMDALE__	1	2%	97%
SHERMAN_OAKS_	1	2%	98%
SYLMAR__	1	2%	100%
Total # Firms	**63**		
Total # of Cities	**30**		

SAN_MATEO_	2	3%	73%
PLEASANTON__	2	3%	76%
WALNUT_CREEK_	2	3%	79%
MOUNTAIN_VIEW_	2	3%	83%
REDWOOD_CITY_	2	3%	86%
SOUTH_SAN_FRANCISCO	2	3%	89%
OAKLAND__	1	2%	90%
MENLO_PARK_	1	2%	92%
SAN_RAFAEL_	1	2%	94%
SAN_RAMON_	1	2%	95%
ALAMEDA__	1	2%	97%
FOSTER_CITY_	1	2%	98%
LOS_GATOS_	1	2%	100%
Total # Firms	**63**		
Total # of Cities	**21**		

Source: Author's calculations using UCINET.

Appendix 4: Sampling method and data source for Private Foundation network analysis

The sampling method for Private Foundations followed the same three-step process as for corporations described above in Appendix 2 above, described as follows:

Step 1:

The list of the largest Private Foundations by total assets was built using the following sources for each cross-section:

1980: The Foundation Directory 9th Edition. The directory lists the alphabetical names of all Private Foundations by State, together with information such as city and total assets. These were copied manually into an Excel spread sheet, categorized into the two regions and ranked by total Assets.

1995 and 2010: National Center for Charitable Statistics (NCCS) databases. These were accessed through the UCLA Social Welfare department's paid subscription.

Step 2:

The names of trustees were extracted from the Form 990 accessed throughthe following sources for each cross-section:

1980 and 1995: Form 990s archived at the Indiana University – Perdue University Indianapolis (IUPUI) Library Archives. An RA, Mathew Stevenson, scanned each Private Foundation's Form 990 (front cover and relevant pages with Trustee names) and extracted names into an Excel spread sheet. Names were checked by myself for each Private Foundation against the scanned Form 990 for each Private Foundation.

2010: Form 990s from the National Center for Charitable Statistics (NCCS) online archive. The Form 990 was accessed online via the publicly available online source through the NCCS website. The names of trustees for each Private Foundation was extracted from each organization's Form 990 and pasted into a database.

Step 3:

The database of trustees was cleaned using the same method and protocol described above for corporations, to insure names are spelt identically across organizations.

Sample size:

Sampled firms represented a considerable percentage of total Private Foundation Assets in each cross section. As presented in the table below, in 1980 the total assets of sampled firms represented 87% and 73% of total assets in Southern California and the Bay Area respectively. The 1995 samples represented 83% and 82% of total assets in the two regions, and the 2010 sample represented 70% and 97% of total assets of all Private Foundation assets in Southern California and the Bay Area respectively.

1981_PF_SAMPLE_ASSETS	2,225,290,436	1,630,369,145
1981_PF_TOTAL_ASSETS	2,572,389,460	2,244,942,674
1981_PF_%SAMPLE_ASSETS	87%	73%
1981_SAMPLE_SIZE	50	50
1981_TOTAL_NUMBER	190	118
1995_PF_SAMPLE_ASSETS	12,713,300,000	7,814,800,000
1995_PF_TOTAL_ASSETS	15,400,000,000	9,550,000,000
1995_PF_%SAMPLE_ASSETS	83%	82%
1995_SAMPLE_SIZE	55	55
1995_TOTAL_NUMBER	2,263	1,415

2010_SAMPLE_ASSETS	29,076,742,193	37,698,756,134
2010_TOTAL_ASSETS	41,295,199,613	38,721,874,940
2010_PF_%SAMPLE_ASSETS	70%	97%
2010_SAMPLE_SIZE	53	53
2010_TOTAL_NUMBER	4,596	3,218

Source: Author's calculations.

Appendix 5: Interviewees and interview methods

A total of 24 interviews, 12 in each region, were conducted with a convenience sample of academics, business-people, civic leaders government and business-civic organizations in the two regions. The interviews were conducted in 2010, 2011 and 2012. Interviews were semi-structured open-questions designed to gauge perspectives on the cause behind the LA-Bay Area divergence over the 1980-2010 period. Typically the interview began with the question "Why in your opinion did the two regions' income diverge as they did since 1980?"

Below is a list of interviewees:

Southern California		
Jennifer Wolch	Academic	USC
Anonymous	Business Elite	Anonymous (In LA's 1995 & 2010 Interlocks)
Jaquie Warren & Bill Valdouris	Business-civic org	OC Chamber of Comemrce
Guilda Haas	Civic (CBOs)	SAJE
Mark Pisano	Government	SCAG
Michael Woo	Government	Los Angeles City Councilman, '85-'93
Hassan Ikhrata	Government	SCAG

Wallace Walrod	Government	Orange County Business Council
Maureen Kindel	Government	Kindel Associates
Gill Hicks	Business-civic org	Cambridge Systems Inc.
Dr. John Husing	Business-civic org	Economics and Politics Inc.
William Hanna	Business Elite	Jacobs Capital Group LLC

Bay Area		
Paul Diguid	Academic	Berkeley
Richard Walker	Academic	Berkeley
Anno saxenian	Academic	Berkeley
Woody Powell	Academic	Stanford university
John Zysman	Academic	Berkeley
Dave Bergeron	Business/Electronics	Silicon Valley technology Centre
George Scalice - President	Business/Electronics	Semi-conductor association
Jim Lazarus	Business-Civic Org	SF Chamber of Commerce
Sean Randolph	Business-civic org	Bay Area Council
Jed kolko	Think Tank	PPIC
Max Neiman	Think Tank	PPIC
Katie Quan	Civic (Unions)	Labor Center - Berkeley Uni

About 40 hours of audio was transcribed and coded into the following categories:

- **Competition versus cooperation**
  - Networks
    - Inter-firm networks
    - Business-civic engagement & Philanthropy
    - University-industry relations

        - Other Orgs
    - Regional Organizations
    - Mobilizing for State dollars
    - Political fragmentation
    - Jurisdictional fragmentation
- **Regional Identity**
    - United Under-dogs
    - Culture
        - Bureaucratic/Mass-Market Vs Entrepreneurial/Specialized
        - Open, Diverse & Cohesive Vs Fragmented
        - Left/Bohemian Counter-Culture Vs Right/Conservative
        - HQ Vs. Branch-Plant Economy
- **Role of history**
    - Technological Antecedents
    - Semi-conductor history: Shockley & Fairchild
    - Immigration
    - Role of Downtown
    - Political History
    - Crisis hits SoCal harder
- **Role of first nature geography**
    - Scale on interaction
    - Location on Migration
    - Role of the Bay
    - Housing Costs
- **City managers**

- Role of City Managers
- Business-City manager cohesion

- **Problem Definition**
- **Critical Action/Regional responses to crises**

Appendix 6: Social Capital data sources and selected variables

Specific variables for the DDB Lifestyle survey were selected as proxies for the degree of generalized trust. Due to insufficient observations responses were aggregated over two decades into two averages: 1977 to 1987, and 1988 to 1998, representing average social capital proxies for the early 1980s and 1990s respectively. The following variables were aggregated into the 'bridging' proxy to represent generalized trust, and standardized:

gun_std - There should be a gun in every home – Available for year 1977-1979, 1983-1989, and 1991-1998. Total observations for LA early 1980s sample: 1,215; and early 1990s sample: 1,856. Total observations for Bay Area early 1980s sample: 517; and for early 1990s sample: 726.

volunt_std - Did volunteer work (freq last 12 months) – Available for years 1977 to 1979, 1983 to 1989 and 1991 to 1998. Total observations for LA early 1980s sample: 1,215; and early 1990s sample: 1,856. Total observations for Bay Area early 1980s sample: 517; and for early 1990s sample: 726.

efrtrecy_std - I make a strong effort to recycle everything I possible can – Available for year 1998 only. Total observations for LA: 194, and the Bay Area: 75.

famcrime_std - I worry a lot about myself or a family member becoming a victim of crime – Available for years 1989 to 1998. Total observations for LA: 1,656; and the Bay Area: 669.

recycle_std - Collected things for recycling (freq last 12 months) – Available for years 1977-1979, 1983-1989, and 1991. Total observations for LA early 1980s sample: 1,215; and early 1990s sample: 585. Total observations for Bay Area early 1980s sample: 517; and for early 1990s sample: 207.

blood_std - Regular blood donor (merged and recoded from BLOOD1, BLOOD3, & BLOOD5) – Available for years 1983-1986, 1992-1994. Total observations for LA early 1980s sample: 423; and early 1990s sample563. Total observations for Bay Area early 1980s sample: 167; and for early 1990s sample: 227.

blood1_std - I have donated blood in the past year – Available for years 1992-1994. Total observations for LA: 563, and the Bay Area: 227.

blood3_std - How many times did you give blood in the last 3 years? - Available for 1986 only. Total number of LA observations: 196, and the Bay Area: 64.

blood5_std - How many times did you give blood in the last 5 years? – Available for years 1983 to 1984. Total number of LA observations: 227, and the Bay Area: 103.

envcons_std - Contributed to an environmental or conservation organization (freq last 12 months) – Available for 1998 only. Number of LA observations: 194, and the Bay Area: 75.

doorlock_std - I always lock doors even when I leave for just an hour or two - Available for years 1989 only. Total number of LA observations: 195, and the Bay Area: 77.

wellazy_std - Most welfare recipients are lazy cheats - Available for 1998 only. Total number of LA observations: 194, and the Bay Area: 75.

Appendix 7: Reports analyzed in archival research, by organization

ABAG

1984 ABAG, MTC and California State Department of Transportation, 1984, "1984-1989 OverallWork Program: For planning activities in the San Francisco Bay Area", April 1984 (Major Report).

1985 ABAG, 1985, "Projections-1985: Forecasts for the San Francisco Bay Area to the year 2005", July 1985 (Major Report).

1987 MTC, Caltrans and ABAG, 1987, "Overall Work program: For Planning Activities in the San Francisco Bay Area, 1987-1992", Draft January 1987 (Major Report).

1989 ABAG, 1989, Centre for Analysis and Information Services, "Special Report: San Francisco bay Area Economy: 1989 and 1990 (January 25th, 1989) (Major Report).

1990 ABAG & the Bay Area Council's LHEAP, 1990, "Blueprint for Bay Area Housing" (Major Report).

1998 ABAG, 1998, "Trends and challenges facing the future of the San Francisco Bay Area" (Major Report).

2001 ABAG-sponsored report, 2001, "Blueprint 2001, Housing element ideas and solutions for a sustainable and affordable future" (Major Report).

2009 ABAG-2009 "Projections and priorities 2009: Building Momentum" (Major Report).

2009 ABAG, 2009 "Projections 2009: What if?" http://www.abag.ca.gov/rss/pdfs/whatif.pdf (Major Report).

SCAG

1984 SCAG, 1984, "Profile of an economic transition: A status report on the Southern California Economy" (Major Report).

1986 SCAG, 1986, "Draft Appendix III-D Baseline Projection", August, 1986 (Pamphlet).

1988 South Coast Air Management District and SCAG, 1988, "Solutions for Southern California's air pollution, growth and mobility: Choices for Action" (Pamphlet).

1990 SCAG, 1990, "Economic profile of the SCAG region", SCAG regional economic profile, Dec. 1990 (Major Report).

1991 SCAG, 1991, "Facts about growth", (Pamphlet)

1992 SCAG, 1992, "Regional Comprehensive Plan", Volume 1, No. 1 (Pamphlet).

1992 SCAG, 1992, "Regional Comprehensive Plan", Volume 1, No. 2 (Pamphlet).

1993 SCAG, 1993, “Regional Comprehensive Plan”, Volume 1, No. 4 (Pamphlet).

1993 SCAG, 1993, “Regional comprehensive Plan”, Volume 1, No. 5 (Pamphlet).

1993 SCAG, 1993, “DRAFT: Regional comprehensive Plan”, December 1993 (Major Report).

1993 SCAG, 1993, “State of the region report” (Dec. 23rd, 1993) (Major Report)

2001 SCAG 2001 “State of the Region Report” (Major Report) http://www.scag.ca.gov/publications/sotr01/sortofc.html

2002 SCAG, 2002, “State of the Region Report” ” (Major Report) http://www.scag.ca.gov/publications/sotrpast.htm#sotr02

2004 SCAG 2004, “2004-2005 Overall Work Program” ” (Major Report) http://www.scag.ca.gov/owp/pdf/104.pdf

2004 SCAG, 2004, “Southern California Compass: Charting the course for a sustainable Southland” (Major Report) http://www.compassblueprint.org/files/scag-growthvision2004.pdf

2005 SCAG 2005, “Regional Airport Management Study”, prepared for SCAG (Major Report)

ECONOMIC ROUNDTABLE:

2012 Getting to Work: Unemployment and Economic Recovery in Los Angeles

2012 Equity below the Wing

2012 Rental Housing 2011: The State of Rental Housing in the City of Los Angeles

2009 Ebbing Tides in the Golden State

2009 Economic Study of the RSO and the Los Angeles Housing Market

2009 Ebbing Tides in the Golden State

2009 Benchmark for a Family-Sustaining Wage in Los Angeles

2008 Op-Ed: Organized Labor Lifts LA Economy

2008 Concentrated Poverty in Los Angeles

2008 Op-Ed: Organized Labor Lifts LA Economy

2007 Planning Economic Growth

2007 Economic Footprint of Unions in Los Angeles

2006 Public Outlays, Local Jobs

2006 Jobs in LA's Green Technology Sector

2006 From the Pockets of Strangers: Economic Impacts of Tourism in LA

2006 Poverty, Inequality and Justice

2006 LA Workforce Investment

2005 Hopeful Workers, Marginal Jobs

2004 Benefits of CRA/LA Social Equity Policies

2003 Prisoners of Hope: Welfare to Work in Los Angeles

2002 Running Out of Time: Voices of Parents Struggling to Move from Welfare to Work

2002 Workers Without Rights

2001 When The Big Wheel Turns

1998 Survival Skills: Welfare to Work in Los Angeles

1998 Ventura Capital Market Connection Survey

1996 Post Cold War Frontiers: Defense Downsizing and Conversion in Los Angeles

1994 Technology and Jobs: Defense Conversion in the Los Angeles Region

1994 Fuel Cells for Transportation: Technical Feasibility and Economic Impacts

1993 Creating Transportation Jobs: Aerospace Industrial and Workforce Capabilities for Surface Transportation Manufacturing

1993 Air Quality Rules in the South Coast Basin: Industrial and Geographic Impacts

1992 Los Angeles County Economic Adjustment Strategy for Defense Reductions

BAY AREA COUNCIL ECONOMIC INSTITUTE

2012 The Bay Area Innovation System

2012 The Economic Impact of Caltrain Modernization

2012 The Economic Impact of the Affordable Care Act on California

2012 The Culture of Innovation: What Makes San Francisco Bay Area Companies Different?

2012 Innovation and Investment: Building Tomorrow's Economy in the Bay Area

2012 Accelerating Job Creation in California Through Infrastructure Investment: Opportunities for Infrastructure Asset Formation and Job Creation Using Public-Private Partnership Procurement Methods

2012 Innovation and Investment: Building Tomorrow's Economy in the Bay Area

2011 Benchmarking the Bay Area's Environment for Entrepreneur-Led Start-ups

2011 Roadmap to a High-Value Health System: Addressing Califoria's Healthcare Affordability Crisis

2011 Options for Financing the Restoration of San Francisco Bay Wetlands

2011 Employment in the Bay Area's Emerging Clean Economy

2011 World Expo 2020, Silicon Valley – USA: Economic Impacts

2010 International Trade and the Bay Area Economy: Regional Interests and Global Outlook 2010–2011

2010 Global Competitiveness, China and California's Emerging Clean Energy Economy

2010 Framework Conditions for Foreign and Domestic Private Investment in California's Infrastructure: Seizing the P3 Opportunity

2010 The America's Cup: Economic Impacts of a Match on San Francisco Bay

2010 Public-Private Partnerships: Alternative Procurement Methods for Campus Development in the University of California System

2010 Recession and Recovery: An Economic Reset

2010 Recession and Recovery: An Economic Reset

2009 Global Reach: Emerging Ties Between the San Francisco Bay Area and India

2009 Managing Recession: Strategic Responses to the Economic Downturn

2008 California High-Speed Rail: Economic Benefits and Impacts in the San Francisco Bay Area

2008 The Innovation Driven Economic Development Model: A Practical Guide for the Regional Innovation Broker

2008 Human Capital in the Bay Area: Why an Educated, Flexible Workforce Is Vital to Our Economic Future

2008 Sustaining the Bay Area's Competitiveness in a Globalizing World

2007 Toward a California Trade and Investment Strategy: Potential Roles for the State in Global Market Development

2007 Innovative Energy Solutions from the San Francisco Bay Area: Fueling A Clean Energy Future

2007 BASIC Innovators Series, Number 2

2007 Measures to Reduce the Economic Impacts of a Drought-Induced Water Shortage in the SF Bay Area

2007 Bay Area Innovation Network Roundtable: Identifying Emerging Patterns of the Next Wave of Innovation

2007 Shared Values, Shared Vision: California's Economic Ties with Canada

2006 Ties That Bind: The San Francisco Bay Area's Economic Links to Greater China

2006 BASIC Innovators Series, Number 1

2006 The Innovation Edge: Meeting the Global Competitive Challenge

2006 Investing in California's Infrastructure: How to Ensure Value for Money and Protect California's Competitive Position in the National and Global Economy

2006 Employer Mandates and the Health Care Crisis: Economic Impacts in California and the Bay Area

2006 The Innovation Economy: Protecting the Talent Edge

2005 International Trade and the Bay Area Economy: Regional Interests and Global Outlook 2005–2006

2005 Visas for Higher Education and Scientific Exchanges: Balancing Security and Economic Competitiveness

2005 One Million Jobs at Risk

2004 Economic Impacts of Competitive Air Service at San Francisco International Airport

2004 The Future of Bay Area Jobs: The Impact of Offshoring and Other Key Trends

2004 Supercenters and the Transformation of the Bay Area Grocery Industry: Issues, Trends, and Impacts

2004 Nanotechnology in the San Francisco Bay Area: Dawn of a New Age

2004 Downturn and Recovery: Restoring Prosperity

2003 Meeting the Challenge of Homeland Security, 2nd Edition

2002 Hetch Hetchy Water and the Bay Area Economy

2002 Air Transport and the Bay Area Economy — Crisis in Air Travel: Weathering the Downturn

2002 After the Bubble: Sustaining Economic Prosperity

2001 International Trade and the Bay Area: Air Cargo, Technology and the Economy of Silicon Valley

2000 Air Transport and the Bay Area Economy—Phase Two

2000 Air Transport and the Bay Area Economy—Phase One

1999 The Bay Area: Winning in the New Global Economy

JOINT VENTURE SILICON VALLEY

1992 An Economy at Risk

1995 The Joint Venture Way: Lessons for Regional Rejuvination, Vol. 1

1998 Silicon Valley 2010: A Regional Framework for Growing Together

1998 The Joint Venture Way: Lessons for Regional Rejuvenation, Vol. 2

1999 Workforce Study

2000 Index of Silicon Valley

2000 Internet Cluster Analysis

2001 Index of Silicon Valley

2001 Next Silicon Valley: Riding the Waves of Innovation

2002 Index of Silicon Valley

2002 Next Silicon Valley: Opportunities and Choices

2002 Workforce Study: Connecting Today's Youth with Tomorrow's Technology

2003 Index of Silicon Valley

2003 Building the Next Silicon Valley: Strategy and Actions

2003 Preparing Tomorrow's Innovators

2003 Tax Principles Workbook: A tool for Critiquing Tax & Fiscal Proposals

2004 Statement of Principles: California Budget and Tax Reform Initiative

2004 Index of Silicon Valley

2004 Main Street Silicon Valley: Shared Issues, Snapshots of Success and Models for Moving Forward

2004 The Future of Bay Area Jobs

2005 A Vision of a Wireless Silicon Valley

2005 Index of Silicon Valley

2006 Index of Silicon Valley

2007 Index of Silicon Valley

2008 Index of Silicon Valley

2008 Smart Valley and Smart Health: A Final Report to the Community

2008 Cell Phone Coverage Primer

2009 Index of Silicon Valley

2009 Special Analysis: Economic Restructuring and Workforce Transitions

2009 Climate Prosperity: A Greenprint for Silicon Valley

2010 Silicon Valley Index

2010 Workforce Study

2011 2011 Silicon Valley Index

2011 Cross-jurisdiction Collaboration: New Models for State, Regional, and Local Governments

2011 Purchasing Power: Best Practices Guide for Collaborative Solar Procurement

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