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**RENEGOTIATING ADJUSTMENT: INSTITUTIONAL INNOVATION
AND ECONOMIC RESTRUCTURING IN NORDIC EUROPE**

Dissertation Prospectus

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Research Question: Do allegedly stable negotiated economies, characterized by dense networks linking encompassing trade unions, employer associations, firms and state agencies, possess capacities to engage in radical economic restructuring, thereby repositioning themselves with the global economy? More specifically, when and how do some negotiated economies successfully enter fundamentally new, rapidly evolving high technology industries?

1. The Puzzle

1.1. The Theoretical Context: Adjustment in the Negotiated Economy

This research project begins with the enduring distinction between liberal and negotiated economies. The latter comes in a wide variety of shapes and sizes, with each conception emphasizing the delegation of authority to organized actors to coordinate production and policy-making in ways that deviate from free market competition and price signals. This project focuses specifically on negotiated economies, characterized by tight linkages between universal banks, encompassing employer associations and trade unions at the sectoral and national levels.¹ This constellation of institutions is alternately conceptualized as ‘neo-corporatist’ (Schmitter 1979) or ‘coordinated’ (Hall and Soskice 2001) depending on relative emphasis placed on centralized, national level concertation between encompassing, monopolistic interest groups and more decentralized cooperative interactions. Each conception emphasizes inter-firm cooperation, long-term investment, specialized skill accumulation and high levels of social protection.

The negotiated economy has thus been linked to a distinctive, even ‘superior’ (Pekkarinen et al 1992), pattern of adaptation emphasizing incremental adjustment and gradual upmarket movement (Katzenstein 1985, Streeck 1991, Hall and Soskice 2001). The dominant position of stake-holding universal banks facilitates long-term patterns of investment in technologically complex but gradually evolving industries like machine tools (Thelen 1991) or windmills (Christensen et al 2005). Employment stability (and high levels of social protection) gives employees similar incentives to invest in highly specialized skills while collective bargaining agreements safeguard firm investments in their employees (Estevez Abe et al 2001). Innovation

¹As such, this research proposal does not address interesting developments in the state-led economies of France, Japan, Korea, Taiwan or Singapore.

tends to privilege the diffusion and application of existing technologies rather than creation of radically new processes and technologies (Ziegler 1997). Collectively, these features create a ‘institutional comparative advantage’ in incremental or gradual adjustment. Even the most innovative and ambitious efforts to link “corporatism and change” describe a modernization of existing sectors rather than Schumpeterian leaps into fundamentally new industries (Katzenstein 1984, 1985). Interestingly, this is especially true of small states, which lack the resources or scale to compete in highly innovative, growth-oriented, R&D intensive industries and must consequently rely on technological diffusion within existing industries and incremental, process-based innovation (Lundvall 2002).

This distinctive adjustment trajectory is especially relevant in light of rapid evolving information and communication technology (ICT) markets during the 1990s. Characterized by exceptionally rapid growth relative to traditional industrial sectors even after the ICT bubble burst in 2001, telecommunications and software markets represent a lucrative market opportunity. The impressive performance of economies like Ireland and the United Kingdom during the 1990s is linked in significant measure to their competitive position within large and growing ICT markets (OECD 1999, 2003). Meanwhile, rapid growth in ICT production has the potential to spill over into other sectors, generating rapid productivity increases across the entire economy (European Commission 2002, 2003a). Most ambitiously, the disaggregation of production value chains and the creation of cross-national production networks allows nations to reposition themselves within the international economy, creating unprecedented opportunities to assume leading roles in new industries (Zysman 2004). Restructuring is particularly imperative as new innovations generate unprecedented cost-based competition within traditionally stable, high-end, niche markets.

The benefits associated with rapid technological change, however, appear to advantage liberal economies at the expense of their negotiated counterparts. Liberal economies, characterized by decentralized, arms-length competition between individual firms, are best positioned to move into fundamentally new and rapidly evolving (ICT) industries. Decentralized financial institutions and highly active labor markets are best situated to promote fundamentally new innovations and capitalize on those innovations within growth-oriented firms (Hall and Soskice 2001). Moreover, the fast and flexible reallocation of resources enables liberal economies to make the most of these innovations and shift resources into new, rapidly growing sectors.

By contrast, the dense linkages between universal banks and firms characteristic of negotiated economies are believed to slow the redistribution of resources to emerging sectors.² Even if negotiated economies could by aptitude or accident situate themselves within high technology markets, they are not necessarily flexible or nimble enough to adapt to the rapid, successive changes necessary to sustain their position in these markets. As a result, negotiated economies are expected to diffuse new information and communication technologies to existing medium and medium-high industries, using it to reinforce or modernize existing comparative advantage. Even here, negotiated institutions appear problematic as excessively “generous” social protection and “inflexible” labor market institutions prevent managers from making the necessary reforms to capitalize on the new potential of information and communication technologies (Rehn 2003, Finland in the Global Economy 2004). To the extent that negotiated economies can capitalize on technological innovation, many argue that the stratifying consequences of technological change contribute to the demise of more encompassing, solidaristic policies that lie at the heart of the negotiated market economy (Pontusson and Swenson 1996, O’Riain 2004). Marginalized in ICT markets and from the developmental opportunities associated with them, it is no surprise that negotiated European economies witnessed deteriorating economic performance during the 1990s and increased speculation about their long-term viability (Kurzer 1993, Pontusson and Swenson 1996, Rehn 1996, Streeck 1997, Iversen and Wren 1998, Streeck 2001).³

1.2. The Empirical Domain: Nordic Entry Into High Technology Markets

A preliminary analysis of developments in Western Europe would appear to confirm the preceding set of theoretical expectations. Continental European negotiated economies lag on a number of important (albeit highly aggregated and indirect) measures of ICT production as compared to the United States or the United Kingdom (see Table 1). German exports remain

²A number of state-led economies in Eastern Asia represent an empirically and theoretically important exception to this general trend. Korea has assumed a leading role in telecommunications, Taiwan has developed an impressive software industry and Singapore leads on an impressive number of indicators relating to ICT production and diffusion. While significant, this research project is more narrowly focused on the counterintuitive success of negotiated economies like Finland and Sweden.

³While economies like Denmark, the Netherlands and Ireland were able to adapt with recourse to a mixture of selective liberalization (Rhodes 2001), wage restraint (Hassel 2003) and increased labor market expenditure (Visser and Hemerijck 1997), these measures did not necessarily inspire confidence in the long-term viability of the negotiated economy.

composed primarily of medium-high technology industries like motor vehicles, chemicals and machinery. While Germany has entered a number of prominent high technology areas like biotechnology and telecommunications, it is focused on relatively incremental forms of telecommunications equipment and platform-based biotechnology (Casper and Whitley 2002). Austria and Belgium, meanwhile, are characterized by an even lower specialization in high technology technology industry (OECD 2003, 193-194) and all three countries lag with respect to technology intensive manufacturing's contribution to total value added (OECD 2003, 189). Moreover, these economies are not necessarily better with respect to ICT diffusion and utilization either as productivity growth continues to lag behind the United States (European Commission 2003a). Collectively, developments on the continent appear to confirm the theoretical expectations outlined above.

Table 1: An Informal Overview of High Technology Performance

	EPO High Tech Patents (2001)*	High Tech Value-Added (2002)**	Share of High Tech Exports (2001)**	ICT Expenditure (2002)*	Commercial Use of Internet (2002)*
Liberal Market Economies					
US	-	3.7	37.9	-	-
UK	82.8	3.0	40.3	123.2	104.0
Ireland	53.1	8.6	58.2	63.5	150.2
Continental Negotiated Economies					
Austria	108.1	2.1	15.6	97.5	128.0
Belgium	84.2	2.2	15.0	95.2	-
Germany	192.4	2.4	20.6	103.1	152.0
Nordic Negotiated Economies					
Denmark	131.0	2.3	20.6	112.5	184.0
Finland	209.7	6.1	24.4	111.0	208.0
Sweden	227.6	3.7	23.5	152.4	236.0
Additional Economies (with incomplete information)					
Netherlands	150.7	-	29.8	128.0	128.0
Norway	-	1.0	12.0	-	-
Switzerland	-	-	37.1	-	-

*Indices from European Commission 2003b, where 100.0 represents the EU average.

**OECD 2003

Yet closer examination of Table 1.0 reveals a more complex pattern of adjustment. With the exception of Norway, Nordic economies are strikingly successful in producing and diffusing high technology relative to other negotiated economies. As a result, Denmark, Finland and Sweden consistently rank at the top of liberally oriented international competitiveness rankings (WEF 2003a, 2003b, 2004a, 2004b). A function of the heavily innovation-oriented character of the rankings, Nordic performance is nonetheless striking given their small size, soaring tax rates, encompassing forms of social protection and highly centralized forms of interest intermediation. Nordic Europe thus represents an inspiration for progressively minded politicians and negotiated capitalism more generally as sustained productivity increases offer a mechanism for circumventing pernicious cost-based competition and increasingly confining restrictions associated with European integration (Castells and Himanen 2002 and Lundvall 2002). Politicians as far away as Portugal have sought to solve their economic woes by virtue of a Finnish style “economic shock,” while scholars have identified a social democratic cluster or constellation of institutions, compatible with the new economy, focusing to varying degrees on Finland, Sweden, Denmark and the Netherlands (see Boyer 2000, Castells and Himanen 2002, Amable with Petit 2003, Lorenz and Valeyre 2004).

Within Nordic Europe, Finland and Sweden have proven the most successful in adapting to new ICT-based competition, outpacing star liberal performers on several indicators. Stated in slightly more concrete terms, Sweden consistently leads the EU (and sometimes the OECD) in R&D expenditure as a percentage of GDP, venture capital as a percentage of GDP and Internet infrastructure (OECD 2003). Finland is in second place with respect to R&D expenditure and venture capital, while posting leading figures in per capita high technology patents. Nor is this fundamentally a telecommunications story. Both Finland and Sweden possess highly innovative and dynamic developments in software, with the later country boasting an international recognizing software cluster outside Stockholm (Casper and Whitley 2002, Castells and Himanen 2002). Meanwhile, Nordic Europe has been identified as a bright spot in European biotechnology (Allansdottir et al 2002). Denmark (and Norway), by contrast, adhere to a more traditional, negotiated pattern of adjustment, privileging technological diffusion and utilization (albeit with a considerably greater degree of success). This discrepancy forms a foundation for comparative analysis between three otherwise similar political and economic systems. Consider Finland, Denmark and Sweden in greater detail.

Finland represents the most dramatic and counterintuitive transformation in Nordic Europe (and Europe more generally). In the late 1980s, Finland occupied a comfortable, if unremarkable, position as a leading paper producer and high-end supplier of televisions, cables and transportation equipment to the Soviet Union. This comfortable equilibrium was punctured by the collapse of the Soviet Union in 1991 and exacerbated by mismanaged liberalization and a massive financial crisis. The worst crisis in OECD history at the time, output declined by 14% and unemployment approached 20%. By the end of the decade, however, Finland had emerged as a telecommunications giant (see Hyytinen et al forthcoming). High technology exports climbed from 7% of GDP in 1990 to 23% by 2000 as the electronics industry surpassed the historically dominant paper industry in production volume (Asplund 2003, 14). Following the initiative of the tripartite Science and Technology Policy Council, R&D as a percentage of GDP increased from 1% of GDP in the early 1980s to an impressive 3.5% by 2002 (second only to Sweden). Outside of the telecommunications sector, however, Finland has had difficulty converting innovations (in sectors like software) into commercial success. There is also concern that concerted investment in basic research has privileged large firms at the expense of small and medium-sized enterprises or occurred at the expense of pressing labor market reforms (Ornston and Rehn forthcoming).

Denmark, which relied on cooperation between small and medium-sized enterprises within predominantly low or medium tech niche sectors like foodstuff, clothing and furniture throughout the postwar period, followed a very adjustment different trajectory than Finland. Denmark also suffered from lackluster performance during the 1980s. Unemployment, which averaged 8.1% during the 1980s, was exceeded only by rapidly escalating fiscal and balance of payment deficits. As in Finland, innovation received increasing attention among Danish policy-makers and business leaders. Ten years later, Denmark also ranked highly along most innovation-oriented indices or rankings by the end of the 1990s (WEF 2003b, WEF 2004b). In stark contrast to the Finnish case, however, Denmark bolstered its existing comparative advantage rather than creating a new one. For example, the government funneled funding to established cooperatives like DTI with the intention of diffusing new technologies to existing firms in existing industries (Lundvall 2002, Nielson and Kesting 2003). Meanwhile, cooperatives sought to promote greater collaboration among their clients to facilitate the expansion of new technologies and best practices. Highly publicized “flexicurity” reforms in the labor market contributed to technological diffusion and process based innovation by encouraging active labor market

turnover (Jochem 2003, Nielson and Kesting 2003, Martin 2004). Basic research and R&D, however, remained relatively low in comparative perspective. Denmark's impressive biotechnology sector is more accurately interpreted as an outgrowth of the agro-industrial sector rather than a sectoral breakthrough (Allansdottir et al 2002) and Denmark failed to capitalize on the NMT telecommunications standard despite an initially advantageous position. Thus, Denmark's emphasis on diffusion and incremental adjustment appears to more closely resemble continental Europe, even as it has adapted relatively successfully to the new economy. As such, the Danish case is designed as an explicit contrast to developments in Finland.

The Swedish case, designed to reinforce analysis of the Finnish case, remains the least developed of the three described here. A preliminary analysis of aggregate level ICT indicators reveals that Sweden outperforms Denmark and Finland alike in several respects. Sweden leads the European Union with respect to R&D as a percentage of GDP, high technology patents per capita and a whole host of ICT infrastructure-related measures (European Commission 2003b, OECD 2003). During the 1990s, Sweden appeared to make the most of its innovative potential by moving into biotechnology, software and telecommunications. While Ericsson's troubles and the bursting of the ICT bubble dented Sweden's status as a 'wireless wonder' (Glimstedt and Zander 2003), it still boasts the most diverse foundation for high technology production in Nordic Europe. Sweden's experience with innovation-intensive and high technology industries is somewhat distinct from Finland's in that it is characterized by a higher degree of historical continuity (this is only a matter of degree). Sweden's historical presence in high technology markets is closely linked to the activities of its powerful, well-organized multinational firms like Ericsson and Volvo.⁴ Consequently, the state's role in shaping adjustment appears to be considerably less direct. While the Swedish state aggressively promoted R&D and venture capital, a coordinated innovation policy did not get off the ground until the late 1990s and some analysts suggest that Ericsson was able to create a favorable institutional framework for high technology production virtually unilaterally (Casper and Whitley 2002, Glimstedt and Zander 2003). In any case, Sweden's ability to successfully capitalize on new opportunities in ICT markets in the 1990s suggests that the Finnish experience was no mere anomaly.

⁴In contrast to Finland, where R&D expenditures were increased following the initiative of the tripartite Science and Technology Policy Council, high R&D in Sweden stemmed from its distinctive industrial structure and favorable tax policies (Rehn 1996).

1.3 Contributions

This brief empirical discussion frames a more general set of questions about contemporary comparative political economy. How did Nordic Europe successfully adapt to rapid and radical technological innovations during the 1990s? More specifically, why were Finland and Sweden able to make Schumpeterian leaps to fundamentally new, rapidly growing high technology industries while Denmark (and Norway) modernized existing comparative advantage through technological diffusion and utilization? In answering these two questions, this research project aspires to make three contributions to the literature on the political economy of advanced market economies. These contributions are distinct, but not necessarily mutually exclusive.

First, this research project speaks to the ongoing debate about liberal convergence, especially as it applies to the ‘new economy.’ Finland and Sweden’s successful entry into high technology markets suggests that liberal market economies do not monopolize on high technology production and negotiated economies are not necessarily limited to gradual or incremental patterns of adjustment. In this respect, this research project speaks to the diversity of institutions governing the new economy, while more precisely illuminating the specific character of these institutions, the political bargains that shaped them and their long-term viability.

Second, and more ambitiously, this research project speaks to the prospects for radical economic restructuring or ‘breakthrough strategies’ in negotiated economies. Typically characterized as paragons of stability and incrementalism, this research project suggests that coordinating institutions can potentially facilitate more radical forms of economic adjustment. Framed in this way, ICT production becomes more important as a ‘critical case’ of radical restructuring rather than a dependent variable of intrinsic interest. Finland and, to a lesser degree, Sweden, represent clear examples of radical restructuring in sharp contrast to the Danish case (see section 5).

Finally, this research project aspires to contribute to the rapidly evolving literature on institutional change in Nordic Europe and in advanced market economies more generally. Denmark, Finland and Sweden represent three of Europe’s most institutionally dynamic and rapidly evolving economies. Their relative neglect following the breakdown of centralized collective bargaining

in Sweden is regrettable because they could inform a discourse on institutional change hitherto focused on the largely static German experience. Careful analysis of recent developments in Nordic Europe sheds light on the opportunities and limitations associated with institutional hybridization or recombination and, in so doing, transcend the dichotomous distinction between liberal change and coordinated continuity (Ornston 2005). With these three potential contributions in mind, this research proposal now turns to a more precise specification of the dependent variable.

2. Specifying Outcomes

2.1 Conceptualizing Adjustment

As described above, this research project seeks to explain different patterns of adaptation to new technological challenges. When do negotiated economies engage in radical economic restructuring by moving into fundamentally new industries and when do they preserve or reinforce existing comparative advantage in established industries? To distinguish between these two divergent patterns of adjustment, this prospectus focuses specifically on (un)successful entry into new and rapidly evolving ICT markets.⁵ Successful entry into ICT markets is not the only way to identify radical patterns of adjustment, but it is the most interesting for substantive and analytic reasons articulated above. Recent years have witnessed increasing attention to technology as a mechanism for creating comparative advantage, increasing productivity and facilitating adjustment. Meanwhile, high technology production in negotiated economies is also the most counterintuitive from the perspective of the traditional literature on negotiated capitalism and small states. Successful entry into ICT is thus an outcome of intrinsic interest as well as a mechanism for identifying radical or discontinuous patterns of adjustment within negotiated economies.

From a practical perspective, movement into ICT production has the advantage of being easy to measure in quantitative and qualitative terms. This research project has already drawn attention to highly aggregated but suggestive quantitative data related to shifts in patenting activity, exports, export shares, employment and value-added, all of which can be decomposed along

⁵Because it is possible that a negotiated economy could experience significant economic restructuring and/or sectoral shifts outside of the ICT sector, analysis will be embedded in a broader review of the secondary literature on key cases like Denmark (and Norway). Preliminary analysis reveals few such trends.

increasingly specific sectoral dimensions. Shifts in R&D expenditure, venture capital availability and educational expenditure can also be cited as measures of innovativeness, although these might be more appropriately considered as independent or intervening variables. In any case, highly aggregated measures of high technology production will be complemented with a more narrowly focused and qualitatively oriented “thick description” (Geertz 1979) at a less aggregated level. Sectoral analysis represents one way to develop a richer description of varying outcomes within each national case while analysis of selected enterprises within a given sector, can illuminate the presence (or absence) of fundamentally new innovations and/or pronounced restructuring at the firm level.

Radical economic restructuring is not the only form of successful adjustment and this research project is sensitive to the important role of technological diffusion and utilization. To what extent did new technologies diffuse to sectors outside of ICT, thereby facilitating a modernization of preexisting industries? Utilization is significantly harder to measure than production by virtue of its more diffuse character. Aggregate measures of ICT investment, broadband penetration, Internet access, e-business, multifactor productivity growth and value added in knowledge-intensive manufacturing and services represent imperfect proxies at the national level, while interviews with economists, policy-makers and economists can illuminate trends outside of the ICT sector. From a strictly analytic perspective, successful diffusion is slightly less interesting because it conforms to our theoretical expectations about incremental, diffusion-oriented patterns of adjustment in small, negotiated economies and it receives less treatment within this research design.

Finally, technological innovation and production will be linked a broader set of macroeconomic indicators. A preliminary examination of developments in other sectors can confirm the presence or absence of significant sectoral shifts outside of ICT. Meanwhile, analysis of prevailing trends in economic growth, productivity and employment can illuminate the boundaries of a specific adjustment trajectory and, in some cases, the nature of the political bargains that underpin it. As explored in section 5.1, all three of the cases considered here could be considered “successful” adjustment stories as judged by GDP growth during the late 1990s. Success, however, was in achieved in very different ways by relying on very different political bargains. For example, Finnish economic adjustment has been characterized by intense innovation and rapid economic growth, but relatively sluggish labor market performance and comparatively limited ICT use. Denmark, by contrast, emphasized “flexicurity”-based labor market reform as a mechanism for

promoting technological diffusion rather than promoting heavy investment in R&D and radical restructuring (Ornston and Rehn forthcoming).

2.2. A Note On Institutional Change

While primarily interested in the way in which specific policies and institutional constellations shaped economic development, this research project also addresses how underlying policies and institutions changed during the 1980s and 1990s. As an intervening variable, to what degree were policies or institutions renegotiated to facilitate adaptation? As a dependent variable of secondary interest, to what extent did technological innovation and/or high technology production affect preexisting societal structures, economic institutions and prevailing policies? As noted above, innovation-intensive strategies can break apart preexisting alliances and create new ones, undermining solidaristic arrangements (see O’Riain 2004 on Irish social partnership or Pontusson and Swenson 1996 on the breakdown of collective wage bargaining in Sweden). Rephrased in the context of this research project, do the “pockets” of competition and innovative activity created by ICT firms in Finland or Sweden coexist with or reinforce existing patterns of organization or do they represent a fundamental institutional shift toward greater liberalization (Glimstedt and Zander 2003)? The issue of institutional change thus links technological innovation and economic restructuring to the broader constellation of institutions associated with the negotiated economy.

To be more specific, this research project focuses on coordinating institutions that are widely recognized as central to the negotiated economy. How does technological change and economic restructuring affect (i) finance, (ii) labor market institutions, (iii) educational and vocational institutions and (iv) inter-firm and public-private linkages (the composition of key societal actors like universal banks, employer associations and trade unions and their relation to the state)? While there is no single, satisfactory, standardized measure of societal organization or concertation that permits cross-national generalization, I believe that it is relatively feasible to measure shifting patterns of concertation longitudinally by mapping out the relationship between different societal actors and the way in which they change over time. Doing so does more than just speak to the long-term viability of the negotiated economy and related social market institutions. It also addresses the long-term viability of a specific adjustment trajectory. To the extent that key coordinating institutions facilitated radical economic restructuring, do recent

changes preserve the foundations for continued success or do they leave less room for maneuver in the future?

At a general level, one can specify three alternative outcomes in relation to the prevailing distinction between liberal and negotiated economies. First, liberal convergence is characterized by privatization, product market deregulation, financial liberalization and labor market decentralization (Pontusson 1992, Rehn 1996, Streeck 1997). A more sophisticated variant of this narrative articulates a more incremental but inexorable shift toward greater liberalization as a result of internal tensions within the negotiated economy (Streeck 2001, Streeck and Thelen 2005). Second, other authors emphasize institutional continuity by pointing to enduring patterns of corporate governance (Hall and Soskice 2001), collective bargaining (Wallerstein and Golden 1997) or centralized concertation (Katzenstein 2003). Third, there is the possibility of viable syntheses or hybrids consisting of liberal and negotiated elements (Stark and Bruszt 1998, Kogut 2003, Campbell 2004). To speak of such hybridization, it must be demonstrated that liberal reforms and new or preexisting coordinating institutions can coexist or complement each other to create a relatively durable constellation of institutions. Previous analysis suggests that durable patterns of institutional hybridization or “recombination,” best characterize contemporary Danish and Finnish labor market, industrial policy and financial institutions (Ornston 2005). It is unclear whether or not this preliminary conclusion applies to the Swedish case, however, in light of the dramatic breakdown of collective bargaining institutions and the unilateral withdrawal of the employer associations from a wide range of bipartite and tripartite committees. The current state of inter-industry and state-industry linkages in Sweden requires further research.

3. Explanations

3.1. Inherited Comparative Advantage, Superior Management and Luck

Before explaining how allegedly sclerotic negotiated economies like Finland and Sweden successfully shifted to rapidly evolving high technology industries, it is first necessary to establish that ICT production was not a product of inherited industrial structures or fortunate market developments. These two rival hypotheses can be addressed, in large measure, through

more careful attention the dependent variable. With respect to the first rival hypothesis, longitudinal analysis reveals that Finnish and Swedish success did not stem from long-standing comparative advantage. During the 1970s and 1980s, Sweden excelled in Fordist-style mass production in metal-bending industries and Finland was defined by its status as a paper producer and high-end supplier to the Soviet Union, not unlike Denmark's specialization in high quality foodstuffs, clothing and furniture. By the end of the 1980s, all three nations seemed to epitomize all that was wrong with European-style negotiated capitalism. Finland and Sweden, therefore, witnessed a particularly pronounced shift in comparative advantage that could not be predicted from established patterns of industrial production. Documenting this shift at the national and sectoral level casts doubt on the hypothesis that developments stemmed from inherited comparative advantage (and increases analytic leverage by introducing longitudinal variation within each national case).

Just as it is important to establish that movement into ICT markets in Finland and Sweden represented a radical sectoral shift, it is necessary to account for rival hypotheses that emphasize favorable market developments, the presence of a few well-situated multinational firms and/or superior management. For example, Nordic Europe is described as a telecommunications story, stemming from early adoption of the NMT (although the NMT standard did not translate into telecommunications success in Denmark and Norway). Alternatively, it is interpreted as a product of superior management by national champions Ericsson and Nokia. In both cases, it becomes important to establish that pronounced economic restructuring encompassed not only Ericsson, Nokia and related telecommunications firms, but also extended to independent software and biotechnology sectors as well. This can be accomplished through careful measurement and articulation of the dependent variable, thereby illustrating that this was not a story about a single company (or sector). With respect to the independent variables considered below, it is important to ask whether Ericsson, Nokia and their managers gained leverage from a unique constellation of national level resources and institutions that could not necessarily be replicated at different times or in different nations.

Any convincing explanation of how Finland and Sweden entered high technology markets has to grapple with a broad number of contending explanations, institutions and policies. Rather than pointing to a single master variable that drives variation across these cases and the Europe more generally, the following section outlines a relatively large number of plausible influences. Given

the number of plausible hypotheses presented below and the limited number of national cases, process-tracing and pattern-matching are integral in unearthing confirming or disconfirming evidence (Goldstone 1997). For this reason, rival hypotheses should be presented in a relatively high level of detail to illustrate how they might be falsified or supported through careful fieldwork.

3.2. Liberalization and Change

The first hypothesis uses liberalization to explain Finland and Sweden's Schumpeterian leaps into ICT production. Just as decentralized financial channels, intense competition and active labor markets are hypothesized to constitute the best mechanism for the fast and flexible redistribution of economic resources, so should we expect liberalization to facilitate high technology production. Liberalization can be measured using quantitative data and/or qualitative process tracing with respect to (i) labor market institutions, (ii) finance, and (iii) inter-firm and public-private linkages. Preliminary evidence suggests that liberalization coincided with and, in many cases, preceded a wave of innovative and entrepreneurial activity in Finland and Sweden. Liberalization was most conspicuous in Sweden, which witnessed the collapse of centralized collective bargaining and the decision of Sweden's largest employer association to withdraw from most tripartite bodies. Labor market liberalization, in turn, introduced greater wage dispersion, expanded merit-based remuneration and helped firms to attract specialized labor. In both Finland and Sweden, the state's active role in allocating credit was effectively eliminated by financial liberalization. The economic recession of the early 1990s also dealt a heavy blow to traditional, stakeholding institutions like the universal banks. This, in turn, created opportunities for equity-based finance, facilitating rapid growth and increased turnover among firms, as well as a pronounced reorientation in firm behavior toward increasing shareholder value. The growth of equity-based finance was particularly pronounced in Finland and Sweden relative to Denmark. Simultaneous reforms in capital taxation complemented this pronounced shift in a more liberal direction, with Finland and Sweden allegedly witnessed increased competition resulting from European integration, reforms to competition policy and the breakdown of dense neo-corporatist networks. This reinforced a burst of entrepreneurial activity, the rapid reallocation of resources toward emerging sectors and a remarkable shift toward high technology production.

The plausibility of the preceding story can be ascertained by tracing liberalization over the course of the 1980s and 1990s, comparing Finland and Sweden to Denmark on these numerous measures and, perhaps most importantly, by matching liberalization to corresponding dynamics at the sectoral and firm level.⁶ Interviews with economists, policy-makers and especially firms can help ascertain whether relaxed financial constraints or labor market liberalization facilitated restructuring along lines suggested above. To what extent was liberalization a prerequisite for increased access to finance or skilled labor? Preliminary analysis suggests that liberalization was important, although it coincided with other non-liberal developments. In Finland, for example, proceeds from the privatization of state-owned enterprises were used to carve out an increased role for the public agency Tekes in funding R&D, while wage earner funds were invested in R&D centers and human capital formation in Sweden. Consequently, it is necessary to balance descriptions of liberalization against resources generated by coordinating institutions and related national institutions. The following section describes how the latter might have been integral in facilitating restructuring.

3.3. Varieties of Cooperation

An alternative explanation focuses on how core features of the negotiated economy, including neo-corporatist legacies and contemporary coordinating institutions, might facilitate Schumpeterian leaps into new industries. As with liberalization, this research proposal addresses a relatively broad array of institutions including (i) finance (especially as it applies to the shifting role of universal banks and state agencies), (ii) education, vocational training and human capital formation and (iii) linkages between universities, policy-makers and firms as it applies to research and development.⁷ Consider finance, where the state retained a central role even as it retreated from the practice of issuing firm-specific subsidies. In Finland, policy-makers promoted research and development, aggressively expanded venture capital, encouraged the commercialization of research and negotiated the redistribution of resources to rapidly evolving sectors (for examples, see Adelberger 2000, Schienstock and Hämäläinen 2001 and O’Riain 2004). In less pronounced fashion, the Swedish state reallocated the wage earner funds to expand educational expenditure

⁶Interestingly, Denmark is more liberal than Finland on many measures, but economic adjustment was more incremental in character. Moreover, Finland was characterized by enduring (even increased) patterns of concertation prior to and during radical restructuring.

⁷In the future, this research project aspires to take into account linkages to the international economy and the position of multinational firms like Ericsson and Nokia (articulated elsewhere).

and create R&D centers in the early 1990s. To the extent that Finnish and Swedish ICT firms were enmeshed within and secured finance from these public institutions, it could be argued that cooperative patterns of production absent in Denmark were central in promoting economic restructuring.⁸

Another body of literature links innovativeness to a universal and encompassing welfare state, which promotes heavy and ongoing investment in human capital accumulation and social infrastructure (Castells and Himanen 2002, Lundvall 2002). Human capital investment is not necessarily higher in Nordic Europe than in continental negotiated economies that invest substantial sums in education, vocational training and skill accumulation, although universalistic active labor market policies might better promote the rapid retraining and reallocation of labor in emerging economic sectors. This is best ascertained in interviews with economists, policy-makers and firms that interact with educational and labor training institutions. Do new, ICT-based firms interact with national educational and labor training institutions at a broad level or do they draw expertise from a relatively narrow range of institutions? Is human capital investment perceived as a national resource that cannot be replicated abroad? Even here, however, levels of human capital investment do not vary meaningfully across Denmark, Finland and Sweden. It is thus imperative to investigate variation in the structure of educational, vocational and labor market investment within the three countries.⁹ Preliminary evidence also suggests significant variation over time as education was central to macro-political bargains and institutional reform during the 1980s and early 1990s. In addition to interviews, specific patterns of increased educational expenditure, engineering-based reforms and R&D promotion could be matched to sectoral- and firm-level stories to ascertain its significance in longitudinal perspective.

A third, related explanation emphasizes dense inter-firm linkages, where cohesion or cooperation across firms or between employers and employees facilitates innovation. The network approach to innovation argues that innovation results from sustained interactions between different producers, consumers and researchers (Schienstock and Hamalainen 2001, Castells and Himanen

⁸On the demand side, it is also important to consider public procurement of evolving ICT technologies as another important, non-liberal source of finance.

⁹For example, Finland and Sweden produce a disproportionately large share of engineers, on par with France and Germany (European Commission 2003b). As my statistics date from 2001, it is unclear whether this is a cause or product of the ICT boom. To the extent that heavy investment in engineering predated the 1990s, what caused policy-makers in Finland, Sweden, Ireland or Korea to invest so heavily in engineering relative to other nations?

2002, Lundvall 2002, O’Riain 2004, Hyytinen et al forthcoming), while networking also facilitates the concerted redistribution of resources to evolving sectors once a promising opportunity has been identified. The most feasible approach for measuring networks is to map out shifting relationships between firms, sectoral associations, universities and state agencies and confirm the significance of salient networks in interviews. What networks do policy-makers and firms each identify as most significant? Did firms derive adaptive advantages that would not have existed in the absence of these networks? Here, it is important to explore variation across countries, sectors, firms and time. Networking by itself does not explain varying performance in similarly small, cohesive, densely organized economies. Rather, it was the character of small cooperative networks in Denmark that facilitated technological diffusion and process-based innovation within existing sectors, whereas a heavier emphasis on research institutes and public agencies appeared to promote radical innovation and rapid restructuring in Finland.¹⁰

3.3. Variation Across Policies, Over Time and Among Actors

The preceding hypotheses are not intended to be mutually exclusive in character and this research project is concerned with the interaction between different developments like financial liberalization, human capital investment and inter-firm linkages. Otherwise independent or ostensibly divergent developments may coexist with or even reinforce each other. Preliminary evidence suggests that the interaction between increased liberalization and greater inter-firm collaboration or public investment is particularly significant. As described above, institutional “recombination” may be the best way to characterize the process by which financial and trade liberalization provoked intense inter-firm collaboration in Finland during the 1990s (Ornston 2005). This and other interactions between liberalization and cooperation are analytically significant, especially if they can be replicated across multiple national cases and within multiple sectors.

In addition to remaining sensitive about the existence of several, ostensibly divergent influences in promoting radical restructuring, this research project seeks to exploit longitudinal variation in the dependent and independent variables. While implicit in the preceding discussion of

¹⁰Note that policy-makers may play a significant role in promoting networking (Castells and Himanen 2002, O’Riain 2004) and this research project aspires to explore (i) the salience of public-private networks and (ii) the degree to which private networks were self-initiated and self-sustaining.

liberalization, it is worth emphasizing that this research project is focused on *varying* patterns of coordination in finance, human capital formation and inter-firm linkages. Denmark, Finland and Sweden experienced significant changes in all three areas over the course of the 1980s and 1990s, not all of which reflected increased liberalization. Varying patterns of coordination, including aggressive public promotion of venture capital, heavy investment in human capital formation and efforts to bolster linkages in research and development, represent a foundation for detailed process tracing and an important source of analytic leverage (see below).

Finally, longitudinal variation raises questions about who or what is driving institutional changes. While not an explicit component of this research prospectus, the varying influence of tripartite macropolitical bargaining, state intervention and individual firms like Ericsson and Nokia speaks directly to the salience of different independent variables, the existence and character of institutional change and the long-term viability of any trends identified in the analysis. As articulated in other research, macropolitical bargaining between encompassing trade unions and employer associations across multiple policy areas appeared to play a central role in Finland and Denmark (Ornston and Rehn forthcoming). At the same time, macropolitical bargaining (and coordinating capacities more generally) were influenced by the intervention of policy-makers and it could be argued that inherited institutional capacities and/or shifting partisan preferences played an instrumental role in influencing shifting patterns of coordination. Finally, the relative strength of large, well-organized multinational firms like Ericsson in Sweden and their alleged capacity to unilaterally create an entire set of industrial standards means that firm preferences should also be taken seriously.

4. Research Design

4.1. Case Selection

With more than one variable and only three national cases, the most analytic leverage will be generated through within case analysis rather than comparing countries (Goldstone 1997). Nonetheless, strategic case selection remains central to a sound research design. This project focuses on Finland and Sweden because they represent striking anomalies with respect to radical

restructuring as a result of their status as small, negotiated economies. Using another Nordic country like Denmark as an incrementally oriented contrast case achieves a greater level of control with respect to geographic location, population, prosperity, state expenditure, union density, welfare regime and related variables. Norway, a relative laggard with respect to high technology production (and technology intensive services) is excluded from the analysis on the grounds that its oil revenue renders comparison problematic, but it could be included as a shadow case if its presence established a greater range of variation on the dependent variable. Focusing on Nordic Europe is substantively interesting as these countries have attracted significant attention for their comparative success in ICT production and utilization.

While focused primarily on Nordic Europe, it is worth noting that there is a broader universe of cases that were relatively successful or unsuccessful in entering high technology markets. Austria, Belgium and Germany all represent potential shadow cases that conform to typical expectations regarding the incremental and stable character of the negotiated economy (see table 1). While Germany has a number of successful high technology industries, these are small as a proportion of the total economy and, more strikingly, tend to cluster in relatively ‘incremental’ sub-sectors. The contrast is even more striking in the case of Austria and Belgium, which lag with respect to high technology production and ICT diffusion alike, despite a higher GDP, similar coordinating institutions and comparable expenditures on education. Moreover, while Austria is characterized by relatively successful adjustment by virtue of its capacity to upgrade existing manufacturing industries, Belgium represents a particularly clear and compelling example of maladaptation.

There are two exceptions to the anemic performance of the continental negotiated economy: Switzerland and the Netherlands. Switzerland is characterized by a very strong performance in high technology industries like pharmaceuticals and medical instruments as well as knowledge-intensive services like financial intermediation. This is not a new development, however, and Switzerland’s relatively liberal character makes it less immediately relevant as an additional example of successful high technology production. The Netherlands presents a slightly more counterintuitive example, as high technology manufactures account for almost a third of the country’s exports. The Netherlands has a very strong computer industry, closely associated with Philips and impressive rankings with respect to per capita patents. Viewed in light of its social democratic social policies, experimentation with flexicurity and its innovative pattern of

centralized concertation, there is some merit in linking the Dutch experience to the Nordic one. Yet the Netherlands represents something of a mixed case in the sense that it lags on a number of other innovation-related indicators (indeed, it is perceived as losing momentum in this respect). There is not necessarily much value-added in including this additional case.

One especially provocative and promising way to generalize about Schumpeterian leaps into high technology production is to add Ireland as a type of “most different system” (Przeworski and Teune 1970). Ireland’s successful movement into high technology production is cited as an example of sound liberal reforms, but careful longitudinal analysis reveals that development coincided with institutional experimentation and shift toward greater coordination (see Hardiman 2002). While tripartite social partnership did not cover the multinational and high technology sectors, the state played an active role in encouraging inter-firm collaboration and linking international capital to domestic industries (O’Riain 2004). The dramatic reorientation of industrial policy facilitated rapid upmarket movement and a booming domestic software industry. In contrast to Finland and Sweden, which focused on building up resources domestically and projecting them abroad, Ireland brought multinational capital into the country to develop domestic skills. While different in several important respects (mainly as it pertains to a predominantly liberal market environment, a larger role for multinational capital, a focus on building up networks of small enterprises and a weaker pattern of domestic innovation), the Irish case permits generalization to a most unlikely empirical domain—an ostensible paragon of liberalism. Because I have already conducted some research on the Irish case (Ornston 2004), this represents a most attractive extension for this research project.

4.2. Sectoral Analysis

In addition to process tracing, one way to increase analytic leverage within each of the aforementioned cases (Denmark, Finland and Sweden) is through sectoral analysis. This approach would illuminate salient economic actors and link production capabilities and decisions to national level policies and institutions. Because this research project is focused specifically on movement into high technology production, it is worth considering three potentially relevant sectors: telecommunications, software and biotechnology. As described above, telecommunications is the best-known story, characterized by early liberalization, adoption of the

common NMT standard and subsequent wireless dominance. Despite these relatively favorable conditions, success was not automatic. While Ericsson and Nokia rapidly acquired global dominance, Denmark failed to capitalize on its initially advantageous position in high technology markets. Nor was this merely a story about Ericsson and Nokia, as both relied on a dense network of firms and (at least in the latter case) advantageous national policies and infrastructure.

Table 2: An Overview of Relevant Sectors

	Finland	Sweden	Denmark	Norway (optional)
Telecoms	2	2	1	1
Software	1	2	0	0
Biotech (optional)	1	2	2	0

*2 represents a dominant market position, 1 represents a failure to capitalize on promising developments and 0 denotes a relative absence of activity in a particular sector.

Because telecommunications was so central to Nordic success during the 1990s, it would be prudent to complement analysis of telecommunications with another high technology sector. Software represents a promising case, especially as it applies to Sweden. Not only has Swedish software fared relatively well after 1999, but Sweden specializes in a particular type of software characterized by radical innovation (Casper and Whitley 2002). Consequently, Swedish success is quite counterintuitive. Finland has also witnessed a proliferation of innovations in software (including Linux), although commercialization remains conspicuously underdeveloped. Software, therefore, exposes the limits of an otherwise viable pattern of radical innovation in Finland. Denmark (and Norway), meanwhile, occupy significantly weaker positions within this sector.

A third sector is biotechnology, where all three nations have invested heavily. Preliminary analysis suggests that all three Nordic nations represent one of the most promising regions in the development of biotechnology (EU Biotech). While Germany represents the EU's largest biotechnology producer, Denmark and Sweden lead Germany in the number of companies, number of patents and the amount of venture capital when weighted per capita. Denmark leads in the number of biotechnology patents and availability of venture capital, while Sweden possesses a

larger number of companies and a higher international stature. Finland, despite pouring considerable resources into biotechnology, remains a relatively small player (as does Norway). In this sector, Danish success may constitute the exception that proves the rule. Casper suggests that European biotechnology is characterized by a relatively complex and incremental form of platform innovation rather than the more radically oriented practice of therapeutic biotechnology. Given Danish biotechnology's historically close links to the agro-industrial sector, analysis of this sector might underscore a sustained pattern of incremental adjustment in Denmark. That said, it would not necessarily generate much value-added and this is perceived as an unlikely avenue for future exploration.

4.3. Research Plan

This summer, I intend to engage in further conceptual and empirical delimiting the adjustment pattern of each of the nations described above. While this prospectus sketched out developments in a wide range of European nations with reference to a small number of relevant indicators, I hope to gather more information on the overall adjustment trajectory within each nation using aggregate level indicators and developments in the aforementioned sectors. In addition, I would like to start collecting aggregate level statistics on the hypotheses or independent variables described above, including educational expenditure, the structure of educational expenditure and industrial policy orientation (see above). This will help eliminate or refine the broad hypotheses described above (and contribute to revision and elaboration of section 3). Moreover, in addition to situating Nordic Europe in comparative perspective, this will also help in distinguishing between the Danish, Finnish and Swedish cases.

Within Nordic Europe I plan to use secondary literature and newspaper archives to track the evolution of these different sectors within each nation. Because these are high technology sectors, English language literature is quite abundant. This exercise is designed to serve several functions. First, it enables me to more precisely characterize the challenges that each sector faced during the 1980s and 1990s. Second, it will enable me to characterize their development (as more than just successful or unsuccessful cases). Third, this will enable me to eliminate, develop and refine hypotheses (and interview questions) by exploring the links between specific sectors and national policies or institutions. Finally, this will help me map out the major economic actors

(firms, associations and agencies) who will, in turn, represent subjects for interviews when I travel to Europe to conduct fieldwork from 2005 to 2006.

The three sectoral stories described above will be embedded in a chronological, longitudinal analysis of national level policies and institutions in Finland, Denmark and Sweden. In so doing, I will gain analytic leverage from the fact that Nordic Europe was not always a leading producer in high technology markets. Longitudinal analysis enables me compare different time periods within a single national case, considerably extending the available number of observations (King et al 1994). More importantly, detailed process tracing enables me to test the existence of a relationship shifting market challenges, national institutions, firm behavior, policy changes and economic developments (George and McKeown 1985). I already have some understanding of the Finnish case and I have a preliminary level of familiarity with the Danish case. The Swedish case is relatively underdeveloped and requires the most work over the course of this summer.

I intend to depart for Denmark, Finland and Sweden in late August or early September of 2005. While I would like to continue to collect secondary material (state agencies and research institutes conduct a substantial amount of research on the relationship between specific institutions, policies and firm performance), my attention will be focused on conducting interviews with relevant firms, association representatives, state agencies, policy-makers and academic experts. In interviews with firms, I would like to probe their attitude toward national-level institutions and policies. To what extent do firms view specific policies and institutions (drawn from the hypotheses described above) as beneficial, harmful or irrelevant to their performance? To what extent did firms interact with salient associations or state agencies identified from the secondary literature? How did firms adapt their strategies to accommodate (or change) their environment?

By expanding the discussion to include industry representatives, policy-makers and experts, I would also like to develop a better sense of the political bargains that underpinned important institutional or policy shifts (I suspect that there were important institutional or policy-based shifts in all nations). What, if any, decisions were perceived as central in shaping adjustment at the national or sectoral level? Who made these decisions (who was involved in negotiations and who had real influence)? Perhaps more importantly, what about changes that should have been

made but weren't? What future challenges or obstacles do policy-makers and industry leaders perceive and what might facilitate (or block) the resolution of these issues?

Finally, to the extent that additional research and secondary literature leads me in the direction of new coordinating capacities or liberalization in finance or other areas, it might be possible to complement my research with relevant statistical surveys on firm performance. Such research is common at the institutes with which I am affiliated. Taking advantage of such resources, however, would require me to narrow down relatively holistic accounts to more specific hypotheses about, for example, state involvement or liberalization. This prospectus has been more concerned with keeping an open mind about rival hypotheses on the one hand, and tracking comprehensive political bargains in a more holistic fashion on the other.

I anticipate a nonlinear research plan, spending several weeks in Finland before moving to Denmark and Sweden in the fall of 2005. Following a preliminary sweep of the region, I intend to return to each nation for a second round of interviews and data collecting in the spring. The small size of each nation and my access to key contacts in Denmark and Finland should enable me to conduct research relatively quickly in both nations. I would like to visit Ireland in late spring or summer of 2005 to capitalize on other research and, ideally, add Ireland to my analysis as a shadow case. Two years of funding will give me an opportunity to return to each of the three primary cases or make brief visits to relevant shadow cases (especially Ireland) as I begin to write my dissertation. I would nonetheless like to complete most fieldwork by June of 2006 so that I have the option of competing in the job market later that year.¹¹

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