Four worlds of productivity growth: A comparative analysis of human capital investment policy and productivity growth outcomes

Takayuki Sakamoto
University of Kitakyushu, Japan

Abstract
Labor productivity is an important determinant of the wealth of national economies and standards of living, as its growth explains half of per capita GDP growth. I show that there are four worlds of productivity growth among industrialized countries, by decomposing labor productivity growth into multifactor productivity (MFP) growth and capital deepening. The four worlds that emerge from the analysis are: (1) human capital investment- and MFP growth-dominant Nordic countries; (2) physical capital investment- and labor productivity growth-dominant liberal countries; (3) continental European countries whose moderately high human capital investments create decently high MFP growth, but whose low physical capital investments push down their labor productivity; and (4) South European countries with both the lowest human capital investment and lowest productivity growth. The four worlds are a result partly of the countries' partisan politics, economic growth strategies, and human capital formation policies – different policies add differently to the components of labor productivity.

Introduction

Human capital is important to national wealth and economic growth. Scholars of comparative political economy have shown that different governments pursue distinct human capital formation policies to promote the productivity of the economy (Boix, 1998; Busemeyer, 2015; Iversen and Stephens, 2008; Pontusson, 2005). The literature has suggested, for instance, that to promote productivity, Nordic countries make public investments in human capital through public education, family support, and vocational training. As would be expected from the literature, Nordic countries

Corresponding author:
Takayuki Sakamoto, Department of Policy Studies, University of Kitakyushu, 4-2-1 Kitagata, Kokuraminami-ku, Kitakyushu, 802-8577, Japan.
Email: halosakamoto@gmail.com

(except Denmark) indeed have high labor productivity growth. But there is a puzzle: liberal market economies (LMEs) – whose governments make much smaller public human capital investments – also have high labor productivity growth. It is as high as Nordic countries, and definitely higher than continental European countries that make larger human capital investments than LMEs (continental countries invest less than Nordic ones). That is, high labor productivity growth is achieved both by countries that spend the largest amount of government money on human capital and by those that spend the least. Why? Do governments' human capital investments not matter to productivity? Does LMEs' human capital formation approach with greater emphasis on private provision work as well as Nordic countries' public investment approach? Or is there a reason other than human capital for LMEs' high growth?

This paper shows, among other things, that decomposing labor productivity into its components – multifactor productivity (MFP) and the capital–labor ratio – helps explain why we get such productivity outcomes. The decomposition shows that labor productivity growth is a function of growth in MFP and in the capital–labor ratio. It reveals that there are four patterns of productivity growth generation among major Organisation for Economic Co-operation and Development (OECD) countries: (1) human capital investment- and MFP growth-dominant Nordic countries; (2) physical capital investment- and labor productivity growth-dominant LMEs; (3) continental countries whose moderately high human capital investments create decently high MFP growth, but whose low physical capital investments push down their labor productivity; and (4) South European countries with both the lowest human capital investment and lowest productivity growth. In relative terms, Nordic countries' high labor productivity growth is driven by MFP growth. LMEs' high labor productivity growth is powered by fixed capital investment growth, while their MFP growth is not as high as Nordic and continental countries except in service industries. Decomposition helps us see how the countries' different human capital investment policies may contribute differently to the components of labor productivity and then to labor productivity itself (and consequently to economic growth). The way different countries add to the components is shaped by the their partisan politics, economic growth strategies, and policy profiles in human capital formation.

Productivity is one of the most important factors determining the wealth of national economies and their standards of living. But it has received little analytical attention in political science (a few exceptions are Boyer, 2004; Iversen and Wren, 1998; Kenworthy, 2004; Pontusson, 2005; Wren, 2013). This paper fills the gap by showing how productivity growth varies across countries and suggesting possible reasons for the variation.

This paper proceeds as follows. First, I explain what labor productivity and its decomposition are. Second, I describe how the countries under study are classified in terms of their human capital investment policies. I show that Nordic countries make the largest public investments in human capital, continental countries second, LMEs third, and South European countries the lowest. Third, I identify the countries' performance in labor productivity growth and establish that Nordic countries and LMEs have high growth, and continental countries low growth. Then, I show their performance in the components of labor productivity (MFP and capital–labor ratios) and explain why labor productivity growth turns out to be high in Nordic countries and LMEs, and low in continental countries. Lastly, I report the results of regressions that test the associations between human capital formation policy and productivity growth.

Labor productivity and its decomposition

Labor productivity

Labor productivity is a commonly used measure of the productivity or efficiency of the economy. It is measured as real gross domestic product (GDP) divided by total hours worked; approximately,

how much output the average worker can produce per hour. It is, in turn, an important determinant of GDP per capita, which is an indicator of national wealth and standard of living.[1] Labor productivity growth explains at least half of per capita GDP growth in OECD countries in the 1990s (OECD, 2003). Krugman writes, "Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker" (Krugman, 1997: 11).

Labor productivity can be broken down into MFP and the capital–labor ratio (see online Appendix). Its growth can then be expressed as the sum of growth in MFP and in the capital–labor ratio. The capital–labor ratio is the stock of physical capital per hour worked. It improves labor productivity because a higher ratio means that each worker has more physical capital (machinery and equipment) to work with, and so can produce more output. Thus, physical capital investments promote labor productivity. Conversely, low investments suppress labor productivity. Among OECD countries, increases in the capital–labor ratio account for about 45% of labor productivity growth, and MFP growth explains the rest (OECD, 2007).

Multifactor productivity

Multifactor productivity is a measure of technological progress. It reflects the efficiency with which all inputs are converted into outputs. When MFP rises, a country can produce more output with the same amount of capital and labor input. With the current state of knowledge, there is no easy way to directly measure the growth effect of technological progress. As a result, economists calculate MFP growth as the part of economic growth that cannot be explained by increases in capital and labor input (see online Appendix). As such, it is a residual concept. Nevertheless, it is an indispensable component of analysis of economic output and growth in economics. Economists argue that MFP growth is a central driver of a country's economic growth.

What promotes MFP? Though the following are not an exhaustive list and are not always cleanly separable, we can think of: (1) improvements in human capital; (2) technological advances; and (3) efficiency gains from other sources.

First, high skills and knowledge possessed by workers facilitate innovation and the absorption and diffusion of technological advances. Skills and knowledge also directly improve the quality of labor and contribute to MFP, unless such quality change is explicitly remunerated and incorporated into a measure of labor inputs, in which case its contribution will be captured by labor inputs. Human capital development, in turn, is promoted by education and job training.

Second, technological advances promote MFP. They can be tangible new technologies such as a steam engine, semiconductor chips, or the Internet that improve productivity. They can also be intangible things, such as a new way of producing things, managing businesses or production, reducing slack in the use of capital and labor input, or new scientific knowledge. High human capital also facilitates these changes, since it is well-trained, creative scientists, engineers, managers, and workers that generate, adopt, or implement these changes.

Third, efficiency gains can come from other sources, such as the institutional environment, policies that increase competition, or the incentives of individual workers and firms to generate innovation or adopt and diffuse new technologies. Competition is generally considered to promote productivity, as it encourages firms and individuals to innovate in order to survive competition. In this respect, product market regulations and employment protection legislation (EPL) have been argued to be unconducive to productivity, since they restrict competition, the exit and entry of firms, labor resource reallocation, and adjustments to new technologies and change in market demand.

As we have seen, not all MFP growth comes from improvements in human capital. Yet, human capital is important for both hard and soft technologies to materialize their pro-productivity potential, because even advanced technologies may not help productivity much unless workers and

firms who use them figure out innovative or skillful ways to take advantage of them to raise efficiency. For instance, economists believe that it took the information technology (IT) revolution many years to start showing its real productivity effects because it took workers and firms much time to put it to productive use (Krugman and Wells, 2005).

In sum, human capital, fixed capital, and hard and soft technologies determine labor productivity. Consequently, a country with decent human capital but with low fixed investments can end up with low labor productivity. As we will see, that is the case with continental countries.

Human capital investment policy regimes

The types of policies that can promote human capital formation

Human capital is important to national wealth and economic growth. It is also important at the individual level, as education and skills affect individuals' employment and wage prospects. Its importance is shown over and over again in theoretical and empirical investigations in economics (e.g. Aghion et al., 1999; de la Fuente and Donenech, 2000; Englander and Gurney, 1994; Galor and Zeira, 1993; Lucas, 1988; OECD, 2003, 2010b; Romer, 1990). Major government policy tools that fall under human capital investment policies are: public education; job training and other labor market programs; family support; and redistribution.

Public education and job training can improve human capital (skills and knowledge) and contribute to productivity. Less obvious but also important for human capital formation are family support and redistribution that can reduce the relative costs of skill investments. Individuals' decisions about skill investments are affected partly by the costs of such investments and the perceived benefits of them. For individuals from low-income families, the costs of education are relatively high (i.e., the costs constitute a larger share of their income), because their ability to finance education is more limited than individuals from wealthy families (limited borrowing capability).[2] The higher costs reduce the net benefits of education for individuals with less wealth. As a result, the less endowed may underinvest in education and skills, which may in turn lead to less human capital formation and lower productivity.

Governments can help promote human capital investments by individuals by reducing the costs of investments and increasing their net benefits. Governments' family support policy and redistribution reduce the relative costs of skill investments (as a share of disposable income) by boosting the incomes of low-income individuals and families.[3] Various welfare programs providing cash transfers and in-kind services can directly or indirectly increase the incomes of low-income households and reduce the relative costs.[4] Publicly provided education and job training can also reduce the costs.

In family support, a well-functioning maternity leave policy can encourage women to enter the job market and invest in skills, as it enables them to balance work and family (Bassanini and Venn, 2007). It may promote their skill investments, as women know they can continue to work after giving birth and child-rearing and they do not have to lose or waste skills. The availability of low-cost childcare may also encourage parents' skill investments, as it makes it easy to work while raising children. High-quality childcare can also advance children's academic and social skills and help their performance as students and workers in later years, eventually contributing to productivity.

Cross-national differences in human capital formation policy profiles

Scholars of comparative political economy typically identify three or four clusters of human capital formation policy regimes – Nordic social democratic countries, continental Christian democratic countries, LMEs, and mixed or Southern European countries (e.g. Busemeyer, 2015; Iverson and

Stephens, 2008; Pontusson, 2005). They attribute the differences among the regimes and their origins to differences in industrial relations, electoral systems, and partisan politics. For instance, Iversen and Soskice (2006) explain that as a result of coalition politics, proportional representation (PR) without a strong Christian democratic party leads to center-left governments (Nordic), PR with a strong Christian Democratic Party to center governments (continental), and majoritarian system to center-right governments (LMEs). PR, in turn, was chosen by countries with economic coordination between employers' associations and unions, as coordination required the representation of various interests, whereas countries with low coordination chose a majoritarian system.

In general, in education and vocational training policy, left parties favor a publicly funded, universal education system that benefits families and students toward the lower half of the skills and income distribution – a system represented by large public investments in primary and secondary as well as tertiary education and open access, as seen in Nordic countries (e.g. Busemeyer, 2015; Iversen and Stephens, 2008; Pontusson, 2005). Left parties support such a system to reduce educational and economic inequality as well as boost the competitiveness of their national economies. They favor an integrated, comprehensive school system to achieve these goals and eliminate segmentation. The system raises the academic and skill levels of students and workers in the lower end of the income distribution, contributing to higher average worker quality. High skills nurtured by high-quality public education are also argued to have helped Nordic countries' success in the knowledge-intensive economy, as in information and communications technology (ICT) and other services (Iversen and Stephens, 2008; Wren et al., 2013). The universal education system in Nordic countries is attributed to the dominance of social democratic parties and unions. Their wage compression and productivity growth strategy (the Rehn–Meidner model) also led to high public spending on active labor market policies (ALMP), which was designed to smooth workers' transition from unemployment to reemployment in expanding sectors and improve labor market efficiency (Pontusson, 2005). Nordic countries also have a school-based vocational training system, because of their preference for a comprehensive, universalist education system.

Right parties, in contrast, tend to favor private financing of education and spending on tertiary education, both of which benefit their constituents toward the higher end of the income distribution, as seen in majoritarian LMEs, where right parties are strong. This is often accompanied by low government spending on public schools at the primary and secondary levels and their relatively low-quality education. This creates educational and economic inequality, as upper-class households have the financial resources to send their children to private schools and to good universities, whereas low-income children have no choice but to go to public schools and may discontinue education before college–that is relatively well-funded in LMEs. Educational inequality, in turn, can contribute to low worker quality among unskilled workers. Busemeyer (2015) argues that the education system shifted to private financing and university education in countries where coordination between employers and unions was lacking and a vocational training system was not a viable alternative to college education, as in the United Kingdom. The lack of a vocational training system exacerbates the shortage of skill-formation opportunities for students and workers in the lower end of the skill distribution (Estevez-Abe et al., 2001).

Christian democratic parties in general, as conservatives, support the interests of upper class and skilled workers over those of low-income and unskilled workers (Busemeyer, 2015). As such, they favor an education system that preserves segmentation and stratification – a segmented secondary school system (academic and vocational education) and elitist university education. As a result, their public spending on lower education is not high. They are also generally less egalitarian and redistributive than left parties. But in continental countries, economic coordination between employers and unions and their need for an effective skill formation system led them to develop a workplace-based vocational training system (Busemeyer, 2015; Iversen and Stephens, 2008).

Christian democratic parties supported such cross-class coalitions of employers and unions, and created an education system with significant vocational training. This system conserves educational and socioeconomic stratification. However, the training system opens another route for students and workers in the low end of the skill distribution to access secure jobs, even when they underperform in academic education. As a result, workers have generally high skills (especially specific skills). Further, their vocational training helps reduce youth unemployment and inequality (Busemeyer, 2015).

In work-family policy (childcare, maternity leave and benefits, child allowances, and female employment), left parties are the most supportive. Nordic left parties, particularly, promoted gender equality, female employment, and childcare starting in the 1960s. Female workers were then absorbed in public-sector jobs in education, health, and welfare in the 1970s and 1980s, which were expanded by the same parties (Bonoli, 2013; Pontusson, 2005).

There is complementarity among these features of their work–family policy. Nordic countries promoted female employment partly as a measure of gender equality. Women's labor market participation then created demand for childcare. That led the government to provide childcare in the public sector, which created more female employment. These developments also created demand for parental leave and benefits, and the government created generous leave and benefits policy. These women-friendly policies expanded a female electoral base for left parties (Iversen and Stephens, 2008). Female labor market participation and the revenues from income taxes have also helped finance a generous welfare system. Childcare has also served as basis for early childhood education, which is important for later human capital formation.

Continental countries – where Christian democratic parties were strong – traditionally favored the male breadwinner model. As a result, female employment was low, and work–family spending was not as high as in Nordic countries. Continental countries put more emphasis on cash benefits for stay-at-home mothers rather than the provision of childcare services. This was partly due to traditional Catholic influence, but was also out of concern for unemployment problems that might be made worse by inflows of female workers (Bonoli, 2013). Consequently, the provision of childcare was low. However, France and Belgium have long had extensive preschool systems, and their early childhood education spending has been high. Further, many continental countries made an activation turn and expanded childcare from the mid-1990s to the 2000s. Female employment has grown significantly. As a result, continental countries are now more supportive of work–family policy than before, though as a whole they still score low in gender equality and defamilialization (Kleider, 2015).

In LMEs, female employment and gender equality are higher than in continental countries, but their governments do not promote female employment or help families with public policy, in line with their generally minimalist welfare system. One possible exception is the United Kingdom, that started using work–family policy as an anti-poverty program in the early 2000s – child allowances to pull children out of poverty, and childcare and maternity leave and benefits to let mothers work (Bonoli, 2013).

Scholars argue that these policy choices result from political parties' electoral goals (Bonoli, 2013; Busemeyer, 2015; Morgan, 2012).

The cross-national differences in human capital formation policies reviewed above are observable in our spending data used in this paper. Tables 1 and 2 summarize the classification and features of the four regimes in terms of public spending levels on human capital formation.[5] Overall, when measured by government spending levels Nordic countries make the largest public investments in human capital, continental countries the second, LMEs the third, and Southern Europe the lowest.

In family support and education spending, Nordic countries are the clear leaders. They make the largest public investments in both. Continental countries as a whole spend much less than Nordic

Table 1. List of countries and their human capital investment spending: 4 regimes.

	Nordic countries	Continental countries	Liberal market economies	South European countries
Countries	Denmark, Finland, Norway, Sweden	Austria, Belgium, France, Germany, the Netherlands	Australia, Canada, Ireland, Japan, the UK, the US	Italy, Portugal, Spain
Human capital investment spending (public spending)	*High* in all of family support, education, and active labor market policies (ALMP)	*Moderate* family support *High to moderate* ALMP *Moderate to low* education	*Low* family support *Low* ALMP *Moderate to low* education	*Lowest* in all of family support, education, and ALMP

Notes: Unemployment spending is left out of the table, as both negative and positive roles are conceivable as a human capital investment policy. There are partial exceptions within liberal market economies' spending; family support spending in the UK and Australia is moderate, and education spending is moderate in Canada and New Zealand.

ones in family support, but Austria, France, and Belgium, closely follow Nordic countries. LMEs as a whole spend the least in family support (excluding Southern Europe). The exceptions are Australia and the United Kingdom, which spend almost as much as the continental top spenders.

In total education spending, continental countries' spending is much lower than Nordic countries, and is only slightly higher than LMEs. But France, Austria, and Belgium, make relatively large investments in preschool, primary, and secondary education (i.e., excluding college, data not shown). LMEs keep up with continental countries in total education spending, because the former's spending on university is large (particularly, Canada and New Zealand).

In ALMP and unemployment spending, Nordic countries have large dispersion among them, but still have the highest spending levels (except for Norway's unemployment spending). Continental countries follow Nordic ones and have high spending levels, except Austria. LMEs spend significantly less than both Nordic and continental countries in both ALMP and unemployment, with the exception of Ireland, whose ALMP spending is moderate.[6]

The features of the regimes shown here are similar to those described by Iversen and Stephens (2008). But there are also differences: while they classify continental countries as having low spending in daycare and preprimary school (levels similar to LMEs), some in my dataset score high in daycare (France, the Netherlands) and preprimary school (France, Belgium, and Austria) (data not shown). France's and Belgium's preschool spending particularly is as high as Nordic countries'. Also, although Iversen and Stephens explain that continental countries have low spending on ALMP, my data show that the Netherlands, Belgium, Germany, and France have high spending, closely following Nordic countries. Pontusson (2005) suggests that their high ALMP spending is meant to counteract the negative employment consequences of restrictive EPL.

The observation that France, Belgium, and the Netherlands rank relatively high in early childhood education and care, family support, and/or ALMP is consistent with recent studies finding their policy locations between Nordic and continental countries (Bonoli, 2013; Busemeyer, 2015; Kleider, 2015). In Belgian and Dutch cases, it may be because their Christian democratic parties are centrist parties and have often formed coalition governments with social democrats, as compared to Germany and Italy, where Christian democrats are rightist (Iversen and Stephens, 2008). In France, a Christian democratic party's political influence is marginal. These factors may have made their policy profiles less conservative than in the other continental countries. Overall, however, they belong with the other continental countries, considering the institutional and political

Table 2. Human capital investment spending: regime averages, 1990–2006.

	Family	Education	Active labor market policies (ALMP)	Unemployment
Nordic countries	932	7.1	376	582
Continental countries	591	5.2	271	488
Liberal market economies (LMEs)	413	4.9	117	218
Southern Europe	171	4.7	107	265
All-country averages	527	5.5	218	388
Country values	Family	Education	ALMP	Unemployment
Nordic countries				
Denmark	933	7.8	443	999
Finland	794	6.6	265	637
Norway	1078	6.9	287	262
Sweden	924	7.2	507	430
Continental countries				
Austria	764	5.6	128	301
Belgium	640	5.3	293	802
France	682	5.6	256	401
Germany	468	4.3	291	394
Netherlands	399	4.9	386	542
LMEs				
Australia	680	4.6	112	279
Canada	229	5.7	119	307
Ireland	481	4.5	233	300
Japan	149	3.3	75	121
New Zealand	512	6.1	120	248
United Kingdom	633	4.7	109	144
United States	204	5.1	53	124
Southern Europe				
Italy	224	4.5	112	135
Portugal	147	5.2	90	120
Spain	142	4.3	120	538
Total	572	5.4	195	352

Notes: Family is family support spending, including child allowances, childcare support, income support during parental leave, and single parent payments (real spending per head, US$ in purchasing power parities (PPPs)); education is public spending for preprimary school through university as a percentage of gross domestic product; ALMP is spending on active labor market programs (real spending per head, US$ in PPPs); and unemployment is spending on unemployment benefits (real spending per head, US$ in PPPs).

origins of their systems, their typically continental response to unemployment (labor reduction and job creation prior to activation turns), and their lower levels of overall public education spending, of gender equality and female employment, and of egalitarianism and universalism than in Nordic countries (Bonoli, 2013; Morgan, 2012).

   Since Nordic countries make the largest public investments in human capital, continental countries the second, and LMEs the third, one would imagine that if higher human capital really improves productivity, if their human capital investments are equally effective per spending in raising human capital, and if human capital is the only thing that affects productivity, Nordic and

continental countries should have higher human capital than LMEs and, as a result, higher productivity growth. One would also expect Nordic countries to have higher growth than continental ones. Let us look at their productivity performance.

Labor productivity performance

Figure 1 reports labor productivity growth for major OECD countries (average annual growth) between 1990 and 2006 in the total economy, manufacturing, and service. The numbers at the bottom are regime averages and the ranking of the regimes.

Nordic countries indeed have high growth, as expected. However, so do LMEs that make small public investments in human capital. Continental countries that make moderately high public investments have the lowest growth, excluding South European countries with the lowest investments and expectedly lowest growth.

For the total economy, Nordic countries have the highest growth, LMEs are second, and continental countries third. In manufacturing where Nordic and continental countries are said to have competitiveness vis-à-vis LMEs, LMEs are first if we include Ireland (an LME), and Nordic countries second. If we exclude Ireland, Nordic countries have the highest growth and LMEs the second highest. With or without Ireland, continental countries have the lowest growth (excluding Southern Europe). In service industries, LMEs have the highest growth, Nordic countries are second. Thus, in all three sectors, continental countries have the lowest labor productivity growth among the top three groups, despite their moderately high human capital investments by governments. All continental countries were below the all-country average, except one or two of them in each sector that were above the average. In contrast, Canada and Australia in any of the three sectors were the only LMEs whose growth was below the average.[7]

Why do we get these labor productivity results? One might wonder if human capital does not improve productivity growth. But that is hard to justify in the face of the many empirical and theoretical studies in economics showing that human capital matters. Might governments' human capital investment policies not improve human capital? Or is it only continental countries' policies that do not work? Or do LMEs that rely more on private investments do a decent job of promoting human capital formation and productivity growth?

We get this productivity outcome partly because labor productivity is determined not only by the productivity of labor *per se*, but also by the quantity (stock) of fixed capital (precisely, fixed capital per worker or per hour worked) and technological progress (MFP), as was explained in the second section. In the case of continental countries, their public human capital investments appear to lead to moderately high MFP growth, but their low growth in the capital–labor ratio (low fixed capital investments) pushes down their labor productivity growth. In contrast, LMEs' MFP growth is not exceptionally high, except in service industries, but their high growth in physical capital investments compensates sufficiently to push up their labor productivity.

Figure 2 reports MFP growth. The regime ranking remains the same when Ireland is excluded from LMEs. In MFP growth, continental countries' performance improves, and their growth is higher than that of LMEs in the total economy and manufacturing. Nordic countries have the highest MFP growth in the two sectors followed by continental countries. LMEs have the lowest growth in these two sectors (excluding Southern Europe), while their growth in service industries is still the highest. In service industries, continental countries still have the second lowest growth, suggesting a problem that they seem to consistently have in the sector.

Austria, Germany, France, and the Netherlands have higher-than-the-average MFP growth in the total economy and manufacturing. The Netherlands is well above average also in service, closely following the United States and United Kingdom. Belgium is the only continental country
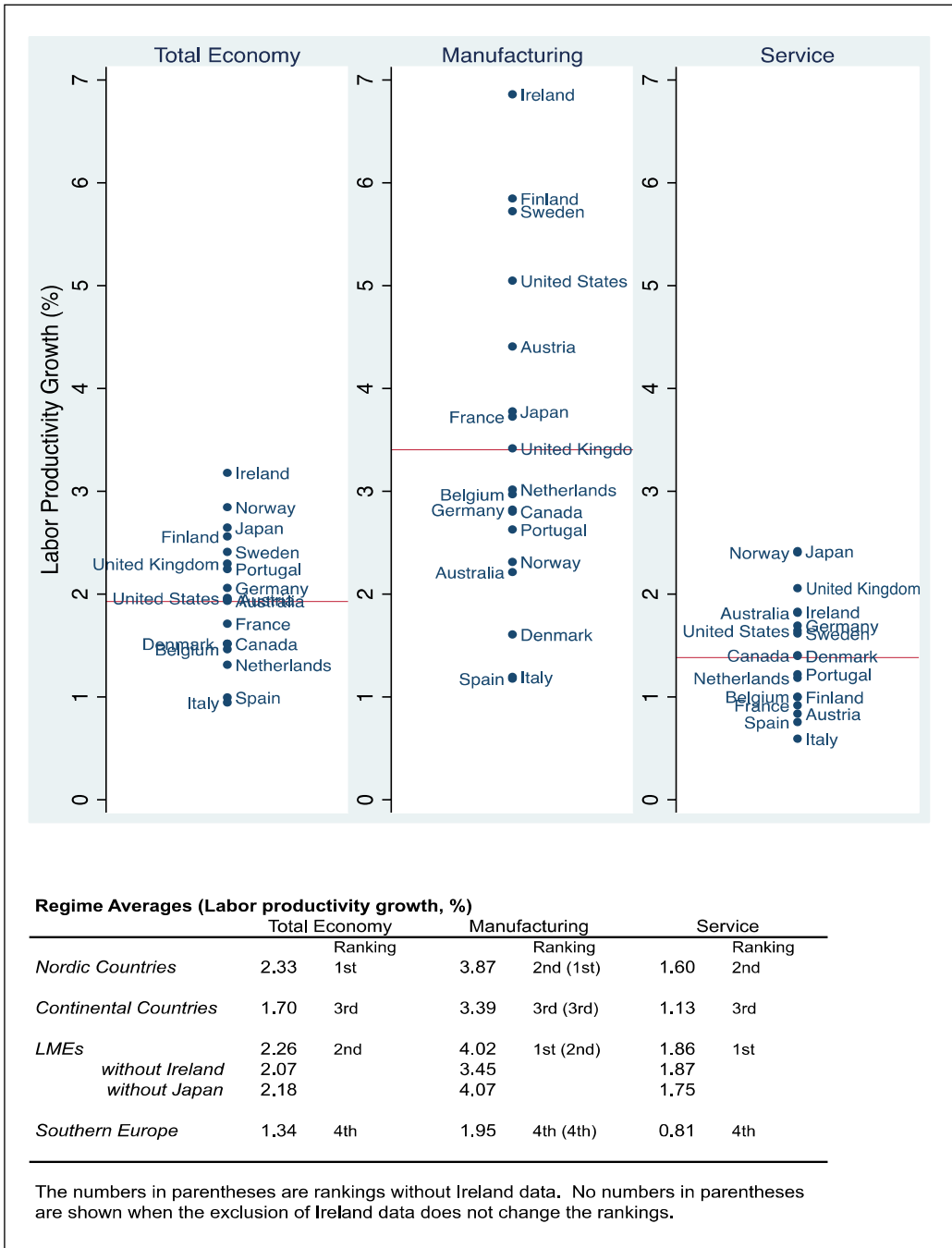
Figure 1. Labor productivity growth, 1990–2006.
Source: EU KLEMS Database (November 2009 Release, available at: http://www.euklems.net/euk09i.shtml).

that consistently underperforms across sectors and in labor productivity and MFP growth. This marks a contrast to continental countries' poor performance in labor productivity growth, where all continental countries were below the all-country average, except for one or two of in each sector.
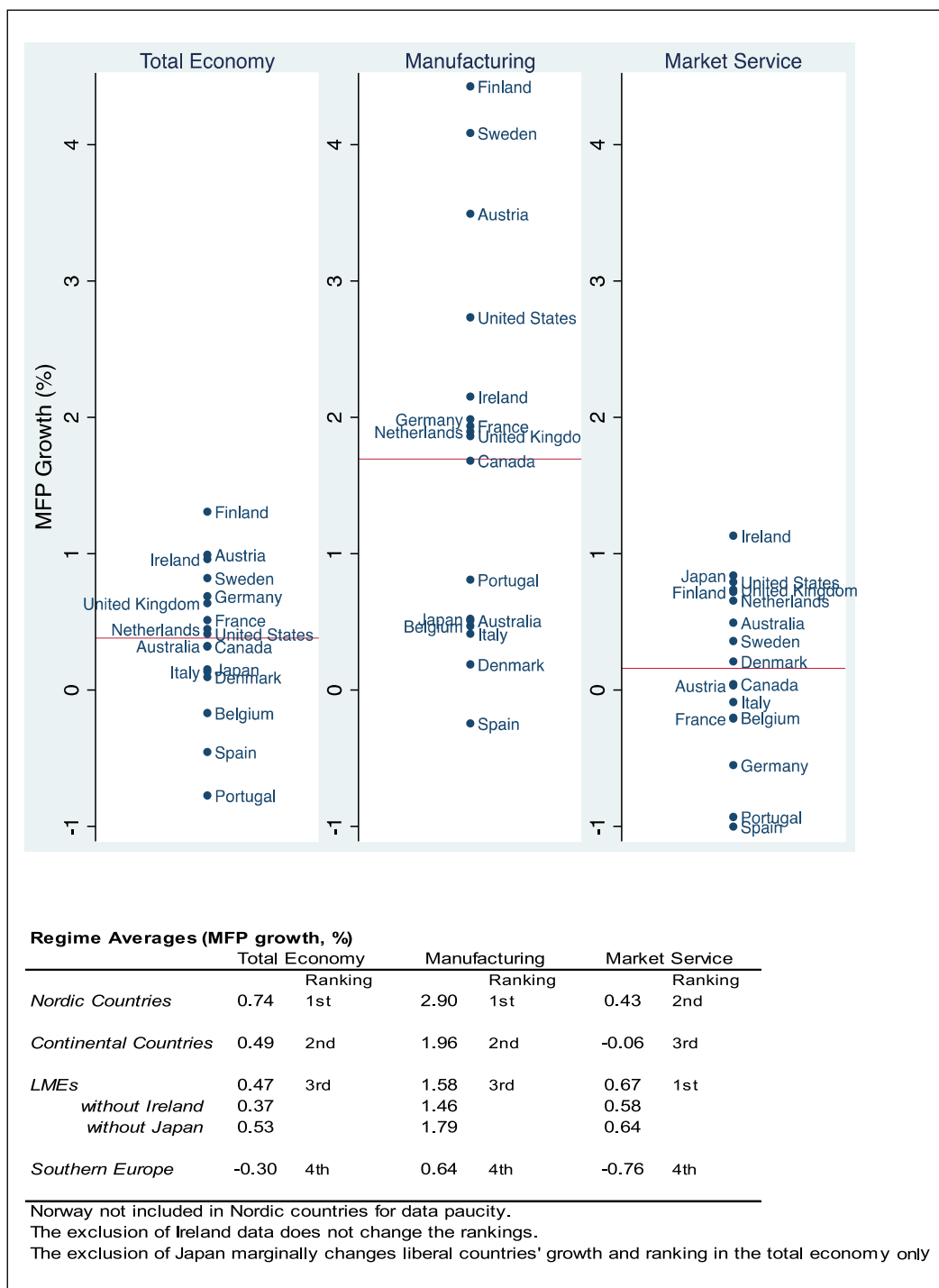
Figure 2. Multifactor productivity (MFP) growth, 1990–2006.
Source: EU KLEMS Database (November 2009 Release, available at: http://www.euklems.net/euk09i.shtml).

Finland and Sweden have high MFP growth in all three sectors. We do not have Norwegian data for MFP growth. But if we did, it should raise Nordic countries' performance still higher, because Norway has very high labor productivity growth but low growth in the capital–labor ratio in the total economy and service industries, which means that it must have high MFP growth.

Liberal market economies as a group have the lowest MFP growth (excluding Southern Europe) in manufacturing and the total economy, although Ireland, United Kingdom, and United States have relatively high MFP growth across sectors.

In sum, Nordic and continental countries with larger public investments in human capital have higher MFP growth than LMEs in the total economy and manufacturing; Nordic countries that make larger investments than continental countries have higher growth than the latter. But in service industries, LMEs achieve higher growth than both Nordic and continental countries, despite low investments. South European countries with the lowest investments of all four groups have the lowest MFP growth.

Next, Figure 3 shows capital–labor ratio growth. The following discussion focuses on Nordic, continental, and liberal countries, as South European countries are somewhat exceptional cases where their high fixed investments reflect partly Portugal's notably high number and partly their capital investment-heavy development typical of countries at earlier stages of development.

Of the remaining three groups, LMEs' capital–labor ratio growth is by far the largest in all three sectors.[8] Japan is an outlier and pushes up LMEs' averages, but even when we exclude Japan, LMEs' averages remain the highest.[9] All LMEs' growth is higher than the average in each sector, with the exceptions of Canada (all three sectors) and Australia (the total economy). In contrast, continental countries' growth is the lowest in all three sectors. All continental countries but one (Germany) are below average in all sectors. LMEs' high growth in the capital–labor ratio pushes up and continental countries' low growth pushes down their respective labor productivity growth. Nordic countries' growth in the capital–labor ratio is also lower than LMEs' and only marginally higher than continental countries', but their high MFP growth keeps their labor productivity growth high. In contrast, continental countries' MFP growth is not higher than LMEs' by a large enough margin to compensate for their low capital–labor ratio growth.[10]

In sum, Nordic countries have high MFP growth – high enough that they achieve high labor productivity growth even with not-so-high capital–labor ratio growth. Thus, in relative terms, their labor productivity growth is driven by MFP growth, which in turn is probably fueled by high human capital investments (as we will see later, it may also be buttressed by active research and development (R&D) spending). Continental countries achieve moderate MFP growth, but not high enough to compensate for low capital–labor ratio growth, leading to low labor productivity growth. MFP growth for LMEs in the total economy and manufacturing is lower than in both Nordic and continental countries, but their capital–labor ratio growth is high enough to push up labor productivity growth. LMEs' labor productivity growth is thus powered by fixed capital investment growth (and some MFP growth for the United Kingdom and United States). Also, they have high growth in service industries in both labor productivity and MFP (despite low human capital investments). If Norway's MFP data were available and included, Nordic countries as a whole would also likely have high MFP growth in service on a par with LMEs, because Norway has high labor productivity growth but its capital–labor ratio growth is low. Finally, South European countries have the lowest human capital investments and the lowest MFP and labor productivity growth of all four country groups. Their fixed capital investment growth is not low (due partly to Portugal's exceptionally high growth), but their labor productivity growth remains the lowest of all, due to very low MFP growth, which in turn is likely due to low human capital investments and low R&D spending.

In general, high MFP growth would not automatically mean that it results from given countries' human capital. It can also be caused by other factors, like technological advances broadly defined and the institutions and policies that promote competition and innovation. But in the case of
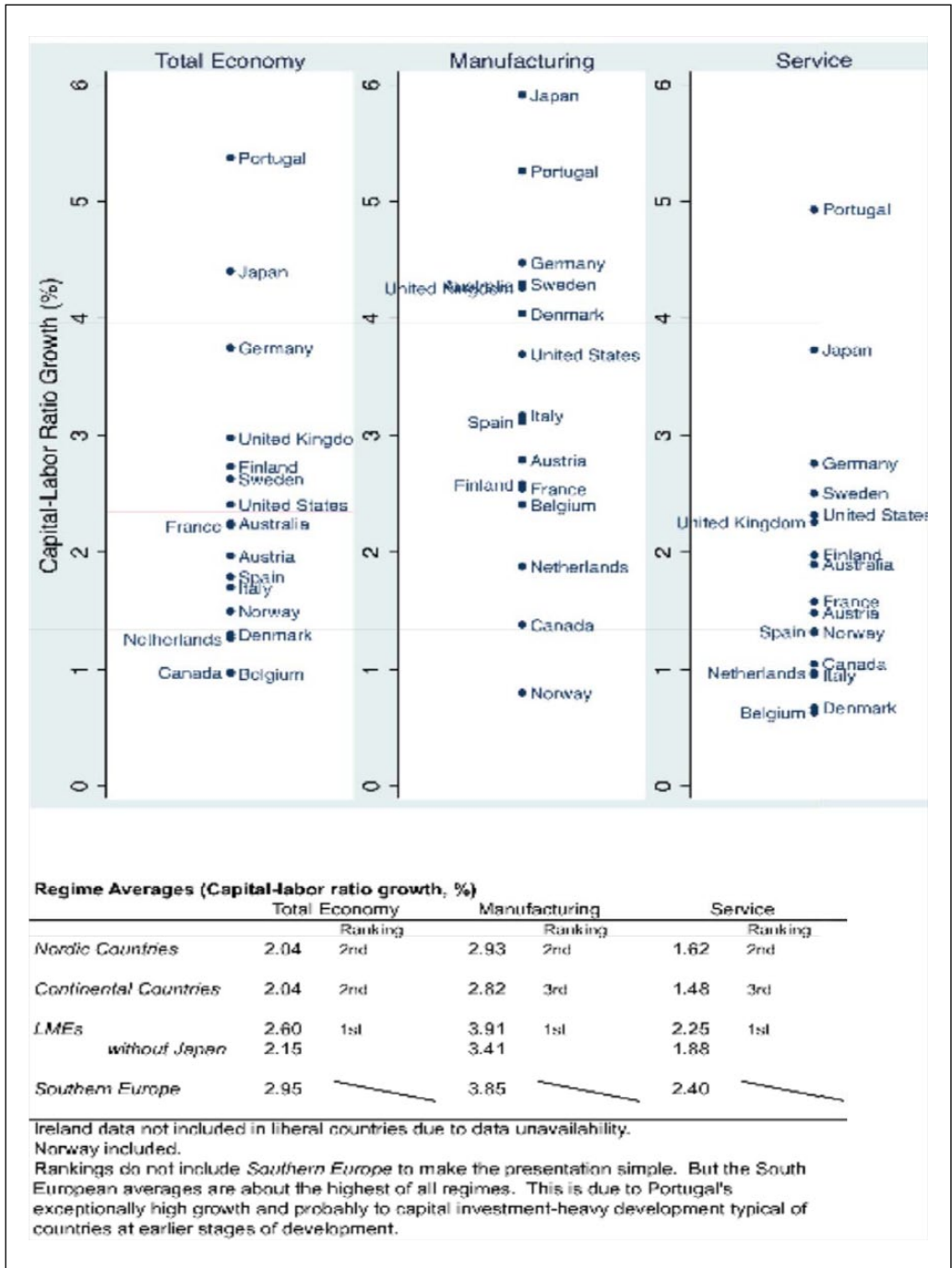
Figure 3. Capital–labor ratio growth, 1990–2006.
Source: EU KLEMS Database (November 2009 Release, available at: http://www.euklems.net/euk09i.shtml).

continental countries, there are reasons to expect that a large part of moderately high MFP growth must be from human capital (plus possibly technological progress), because they do not fare well

Table 3. Research and development (R&D) spending and government gross fixed capital formation (GFCF), 1990–2006.

	Regime averages							
	Total R&D		Government R&D		Government GFCF level		Government GFCF growth	
		Ranking		Ranking		Ranking		Ranking
Nordic countries	2.53	1st	0.80	1st	2.70	3rd	0.02	2nd
Continental countries	2.05	2nd	0.74	2nd	2.43	4th	−1.47	4th
Liberal market economies (LMEs)	2.02	3rd	0.61	3rd	2.97	2nd	1.86	1st
LMEs without Ireland	2.19		0.67		2.95		1.09	
LMEs without Japan	1.81		0.62		2.59		2.64	
Southern Europe	0.91	4th	0.45	4th	3.13	1st	−0.55	3rd

Notes: Total R&D is total R&D spending; government R&D is R&D spending by government; government GFCF is government spending on GFCF; and all is expressed as a percentage of gross domestic product.
Source: OECD.Stat (http://stats.oecd.org).

in the other factors that are usually considered by economists to boost MFP growth – fewer regulations in product and labor markets; higher competition; lower prices; and lower taxes (e.g., OECD, 2002). Continental countries score unfavorably in these factors, compared to LMEs. Thus, their moderately high MFP growth has to come from human capital or technological progress.[11]

It is difficult to empirically disentangle the contributions of human capital and technological advances to MFP growth, and I cannot resolve here the issue of the sources of continental countries' MFP growth. But I suspect that the contribution of human capital is large for three reasons. First, technological advances themselves and their pro-productivity effects depend on the quality of human capital, as I explained earlier.

Second, I do not know of evidence showing that technological progress and diffusion is faster in continental countries than LMEs. If continental countries' technological progress is only as fast as or slower than that of LMEs, then their higher MFP growth needs to be attributed to factors other than technological progress.

Relatedly, R&D can facilitate technological advances and consequently efficiency and R&D spending can be expected to aid them. But continental countries' R&D spending is about the same level as that of LMEs in both total and public spending (although cross-nationally, high-productivity countries tend to have high R&D spending) (Table 3). Although technological progress cannot directly be measured by R&D spending, it is difficult to conclude that continental countries' moderately high MFP growth comes from technological progress powered by large R&D spending. Nordic countries have higher R&D spending in both total and government spending than that of LMEs and continental countries. In their case, a larger role of technology may be suspected, and such is consistent with commonly advanced accounts of Nordic countries' taking advantage of IT technology and their success in IT and high-tech industries (Ornston, 2013).

Third, as we will see below, at least some of human capital formation policy spending is associated with higher MFP growth after controls.

Human capital formation policy and MFP growth

Does government human capital formation policy contribute to MFP growth? I briefly report the results of regressions of MFP growth on public spending on human capital formation policies to

augment the analysis reviewed above. The data are pooled time-series cross-section data from 17 OECD countries between 1990 and 2006. Table 4 reports the results.[12]

As we see, family support and education spending is positively associated with MFP growth. ALMP is positive but significant only in the fixed effects model. So there is not strong evidence of pro-productivity effects of ALMP spending. It may be that ALMP needs to be broken down into individual programs, since it encompasses programs that are relevant to productivity and those that are not (Bonoli, 2013). As a test, I entered spending on job training in place of ALMP, but it was not distinguishable from zero. Redistribution is negative, implying that the negative effects of redistribution may be larger than its benefits, at least for productivity. Probably redistribution is too broad a measure (poverty reduction here)[13] and needs to be operationalized differently or disaggregated to estimate its real pro-productivity effects.

Wage coordination is positively associated with productivity. It may be that wage restraint enabled by wage coordination helps productivity by stabilizing a macroeconomic environment, which in turn encourages investment and productivity. Or cooperation between employers and employees may help improve their incentives to invest in training and skill formation (OECD, 2003), which can assist the use and diffusion of technology.

Employment protection legislation is negative, possibly implying that restrictive EPL can make hiring and firing difficult and impair the ability of firms or economies to adjust to changes in technologies or market demand.[14] Innovation and productivity growth are partly driven by the turnover of firms and workers (OECD, 2003), and EPL restricts the turnover of workers.[15] Lagged per capita GDP is negative, suggesting a catch-up effect. International trade could be hypothesized to promote productivity by increasing competition, but it is never significant, although the sign is positive.

I also estimated the effects of human capital investment policies on labor productivity and fixed capital investment growth, respectively (results not shown). The results tentatively suggest that the pro-productivity effect of family support and education policy may be more through MFP than labor productivity growth. Their statistical significance declines in labor productivity regressions, and they are significant only in models without FEs. In contrast, ALMP is positive and significant in all models, suggesting that ALMP promotes labor productivity growth, although its effect on MFP growth is often indistinguishable from zero. It may be that while ALMP does not contribute to technological progress or efficiency (MFP growth) it improves workers' skills, which in turn enables them to produce more (which would show in labor productivity growth).

In fixed capital investment growth regressions, human capital policy variables understandably have little effect. They are insignificant most of the time. Although one could hypothesize that more investments will be made in countries with high human capital in expectation of better worker performance or higher profits, at least the results here suggest that human capital policy spending does not increase capital investments. These results are tentative and should be viewed with caution.

Discussion

We observe two dominant paths to high *labor productivity growth* among industrial democracies – one is a Nordic-type human capital investment path driven by high MFP growth; the other is an LME-type market-centered path powered by fixed capital investment growth.

The findings do not mean that the promotion of MFP growth and fixed capital investment growth are mutually exclusive. Some countries successfully achieve both across sectors; for example, the United Kingdom, Sweden, the United States, and Ireland (although Ireland's numbers are affected by its rapid economic expansion during the period under study).

Table 4. Determinants of multifactor productivity (MFP) growth.

Variables	(1)	(2)	(3)	(4)	(5)
	Prais-Winsten without fixed effects (FEs)	Pooled ordinary least squares	Random effects	Prais–Winsten with FEs	FEs
Redistribution$_{t-3}$	−0.0516**	−0.0593***	−0.0602***	−0.0507**	−0.0566**
	(0.0255)	(0.0204)	(0.0180)	(0.0256)	(0.0235)
Family$_{t-3}$	0.751***	0.822***	0.843***	0.947**	1.051***
	(0.267)	(0.210)	(0.251)	(0.410)	(0.371)
Education$_{t-3}$	0.334**	0.327***	0.370***	0.424**	0.428***
	(0.133)	(0.105)	(0.143)	(0.177)	(0.158)
Active labor market policies$_{t-3}$ (ALMP)	0.0702	0.180	0.248	0.529	0.627*
	(0.312)	(0.238)	(0.344)	(0.418)	(0.377)
Research and development$_{t-3}$ (R&D)	0.874	0.859	0.525	−2.225*	−2.480**
	(0.763)	(0.663)	(0.769)	(1.166)	(1.056)
Union density$_{t-3}$	−0.00301	−0.00283	−0.00449	−0.0127	−0.00699
	(0.00713)	(0.00569)	(0.00490)	(0.0496)	(0.0445)
Wage coordination$_{t-3}$	0.349***	0.347***	0.352***	0.428**	0.457**
	(0.114)	(0.0932)	(0.109)	(0.198)	(0.193)
Employment protection legislation$_{t-3}$ (EPL)	−0.303	−0.289**	−0.295**	−0.0150	−0.00135
	(0.185)	(0.141)	(0.125)	(0.297)	(0.261)
Trade$_{t-3}$	0.230	0.184	0.0450	0.896	1.222
	(0.562)	(0.427)	(0.604)	(1.813)	(1.649)
Gross domestic product per capita$_{t-3}$	−3.715***	−3.824***	−4.040***	−6.363***	−6.759***
	(1.099)	(0.835)	(1.047)	(1.834)	(1.616)
Constant	33.61***	34.31***	36.24***	60.99***	64.40***
	(10.49)	(7.918)	(9.770)	(17.94)	(15.71)
Common rho	0.28			0.15	
R-squared	0.183	0.276	0.274	0.300	0.363
Observations	291	291	291	291	291

Notes: Dependent variable = MFP growth; annual observations, 1990–2006.
Estimation: Random effects (REs), Prais–Winsten with common AR(1) error process with and without FEs, pooled OLS, and fixed effects. All estimation except REs uses panel-corrected standard errors (PCSEs) to correct for panel hetero-skedasticity and contemporaneous correlation of errors. REs estimation uses robust standard errors. The independent variables are lagged by 3 years to allow for the time it takes policies to have an effect on productivity growth.
Data definitions and sources: The MFP data are from the Penn World Table (version 8.0, Feenstra et al., 2015). Family and ALMP are from OECD.Stat (http://stats.oecd.org), and their definitions are the same as in Table 2. Education is total education spending by government and from UNESCO Institute for Statistics (http://data.uis.unesco.org). R&D is gross government domestic expenditure on R&D as a percentage of GDP (OECD.Stat). Redistribution is the size of poverty reduction by government (gross minus net poverty rates divided by gross poverty rates, interpolated) and is calculated from Brady et al. (2014). Union density and wage coordination are from Brady et al. (2014). EPL is strictness of employ-ment protection, and GDP per capita is the lagged level of real GDP per capita (US$ purchasing power parities) in natural logs, both from OECD.Stat. Trade is trade openness, calculated as exports plus imports as a percentage of GDP from Brady et al. (2014). *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

As important as MFP growth is, countries' labor productivity growth suffers if fixed capital investment growth is low. Continental countries are a case in point (most visibly, the Netherlands). In contrast, although LMEs' MFP growth is not the highest (except in service industries), they can achieve high labor productivity growth because their fixed investment growth is high. Labor

productivity growth accounts for about half of per capita GDP growth, and capital–labor ratio growth explains about half of labor productivity growth. Therefore, there is reason for countries to pay attention to policies and institutions that will promote fixed investments as well as MFP growth. We will probably learn much from investigating how countries like the United Kingdom, Sweden, and the United States have achieved both relatively high MFP and fixed investment growth. Such investigations should be pursued in future research.

Although LMEs as a group have the lowest MFP growth in manufacturing and the total economy, the United States, United Kingdom, and Ireland have relatively high MFP growth across sectors. Although their high productivity growth in service industries has been noted by economists, their growth in the total economy and manufacturing is also decently high. Also, the MFP growth of Canada and Australia is not exactly very low, except for Australia in manufacturing. These productivity data do not fit comfortably with what became a popular explanation in comparative political economy – that is, that service industries in LMEs depend on low wages of low-skill workers for economic expansion and do not have high productivity growth (Iversen and Wren, 1998), and/or that specific skills are in short supply in LMEs, which makes success difficult in industries that require specific skills (e.g. manufacturing) (e.g., Estevez-Abe, et al., 2001; Pontusson, 2005).[16]

There are several possible explanations for LMEs' productivity performance. First, high-productivity service industries in LMEs may mainly employ workers who are high in the skill distribution and these industries may dominate other low-productivity service industries in the sector average productivity growth. Wren et al. (2013) argue that the high wage premium at the top of the skill distribution in LMEs creates incentives for individuals to invest privately in skill formation, and it expands output and employment in high-productivity internationally-traded dynamic service sectors, such as ICT-intensive finance and communications (and indirectly in low-productivity service sectors) (see also Heckman and Jacobs, 2010). This view may hold that private education spending at the top of the skill distribution drives up productivity.[17] Such a view is plausible and should be tested, but it is not evident that skill investments at the top alone can keep productivity high for the entire service sector. Further, a major source of strong productivity growth in the United States starting in the late 1990s was a surge in output per worker in retail (Krugman and Wells, 2005), which is normally considered a low-productivity industry. Sector-specific investigation of determinants of productivity, skill distribution, and private education spending is highly desired to better understand the nature of productivity growth in the service sector.

Second, low skills at the bottom of the skill distribution may not necessarily be a hindrance to productivity growth in these LMEs. The rise of productivity in US retail mentioned above was possible, thanks allegedly to such factors as the computerization of inventory systems and use of bar-code scanners, among others (Krugman and Wells, 2005), and probably despite low skills of retail workers. It may be that although low skills are generally a hindrance, their negative effect can be compensated for by technological advances in certain sectors.

Third, it may be that because labor utilization is high in LMEs, and human capital is better utilized and consequently better maintained, these countries can take better advantage of the productivity potential of human capital (i.e., even high human capital is of no use if it is not used due to unemployment or early retirement) (Heckman and Jacobs, 2010).

Finally, high labor market competition and low employment protection in LMEs may better enable firms to make low-pay workers work hard and produce more – low-skill workers who would usually be unproductive.[18] But if such workers produce more, that would make them productive workers, and their wages usually would eventually rise. Also, low wages would usually lead to an increase in demand for labor, which in turn would lead to higher wages. But again, low worker protection, weak unions, and lack of vocational training opportunities may make it less difficult for firms in LMEs to keep wages low than is the case in European countries.

Since all these possibilities are plausible, to varying degrees, it is evident that more research is needed in these areas.

Notes

1. Real gross domestic product growth = labor productivity growth + labor utilization growth.
2. Aghion et al. (1999) argue theoretically that in the presence of capital market imperfections, individuals' endowments (family wealth) determine their investments in education, and the unequal distribution of wealth reduces aggregate productivity and output growth, because the poor's limited borrowing capacity restricts their investment opportunities in education and their marginal productivity of investment is relatively high due to decreasing returns to individual capital investments.
3. Some scholars point out that some of social investment spending tends to flow toward higher income groups (childcare, parental leave, and in-work benefits) and is thus less pro-poor and redistributive (e.g. Cantillon, 2011). If this is true, it may not help low-income families' skill investments as much.
4. There is indirect evidence to suggest that redistribution encourages education and better academic and wage outcomes – the OECD (2010a) reports that individual income tax progressivity and unemployment benefits are correlated with a smaller influence of parental socioeconomic background on children's academic achievement and their wages.
5. I classify Japan's policy profile as liberal, because its public spending is among the lowest in all of education, training, family, and unemployment, and because Japan also does not have a German-type vocational training system. Japan and the United States are the lowest spenders of all industrial countries, also in terms of total government expenditures and tax revenues as well as most individual spending categories; in this aspect, Japan is more similar to the United States than are the other liberal market economies (LMEs). Further, the results of my analysis do not depend on Japan's classification. In Figures 1–3, I re-calculate the group averages by excluding Japan from LMEs. Excluding Japan does not change the results much (it marginally changes LMEs' multifactor productivity growth in the total economy only).
6. High unemployment spending by Belgium, Finland, and Spain partly reflects their high unemployment.
7. New Zealand would probably join Canada and Australia if its data were available, as it has low growth in both labor productivity and multifactor productivity for the total economy.
8. This is consistent with Boix (1998).
9. The three countries with the highest capital–labor ratio growth – Japan, Germany, and Portugal – are outliers, and their high growth is due to their idiosyncratic circumstances. Japan was in recession in the 1990s and 2000s after the burst of the bubble, and the government repeatedly injected massive public money into fixed capital investments to overcome the recession. Germany similarly faced recession in the 1990s after unification and resorted to large public investments. Portugal is likely to be a case of an emerging economy, where physical capital accumulation takes place at a high pace, fueling economic growth.
10. The causes of continental countries' low fixed capital investments have not been established. Economists list restrictive regulations, low competition, high prices, tax structure or high tax rates, and low returns, as potential causes (e.g. OECD, 2002).

11. Though to a lesser extent, similar things can be said about Nordic countries, as they have more regulations, higher prices, and higher taxes than liberal market economies.
12. I use 3-year lags to allow for the time that it takes policies to have effects on productivity growth. The results remain the same with the use of 1-year or 2-year lags, or with the use of cumulative sums of policy spending, though the cumulative variables lose significance in models with fixed effects.
13. I also tried the size of reduction in income inequality (Gini), but it was indistinguishable from zero.
14. When I use employment protection legislation (EPL) for permanent employment, it is negative and significant in all five models. EPL for temporary employment is not significant, except in relative effects where the coefficient is also negative.
15. If trusted, this would contribute to productivity growth in liberal market economies with low employment protection legislation.
16. Wren (2013) is a first study in political science that takes note of the existence of high-productivity-growth sectors in the service industries.
17. I thank a reviewer for pointing this out.
18. I thank a reviewer for pointing this out.

References

Aghion, Philippe, Eve Caroli and Cecilia Garcia-Penalosa (1999) Inequality and Economic Growth: The perspective of the new growth theories. *Journal of Economic Literature* 37(4): 1615–1660.

Bassanini, Andrea and Danielle Venn (2007) Assessing the Impact of Labour Market Policies on Productivity: A difference-in-differences approach. *OECD Social, Employment and Migration* Working Papers No.54. Paris, France: OECD. Available at: http://www.oecd.org/social/soc/38797288.pdf

Boix, Carles (1998) *Political Parties, Growth and Equality: Conservative and Social Democratic Economic Strategies in the World Economy*. Cambridge: Cambridge University Press.

Bonoli, Giuliano (2013) *The Origins of Active Social Policy: Labour market and Childcare Policies in a Comparative Perspective*. Oxford: Oxford University Press.

Boyer, Robert (2004) New Growth Regimes, but Still Institutional Diversity. *Socio-Economic Review* 2(1): 1–32.

Brady, David, Evelyne Huber and John D Stephens (2014) *Comparative Welfare States Data Set*. Chapel Hill and Durham, NC: University of North Carolina and WZB (Berlin Social Research Center).

Busemeyer, Marius R (2015) *Skills and Inequality: Partisan Politics and the Political Economy of Education Reforms in Western Welfare States*. Cambridge: Cambridge University Press.

Cantillon, Bea (2011) The Paradox of the Social Investment State: Growth, employment and poverty in the Lisbon era. *Journal of European Social Policy* 21(5): 432–49.

de la Fuente, Angel and Rafael Donenech (2000) Human Capital in Growth Regressions: How much difference does data quality make? OECD Economics Department Working Papers,No. 262. Paris, France: OECD. Available at: http://www.oecd.org/innovation/research/1825500.pdf

Englander, Steven and Andrew Gurney (1994) Medium-Term Determinants of OECD Productivity. OECD Economic Studies, No. 22. Paris, France: OECD. Available at: https://www.oecd.org/eco/outlook/33937115.pdf

Estevez-Abe, Margarita, Torben Iversen and David Soskice (2001) Social Protection and the Formation of Skills: A reinterpretation of the welfare state. In Peter A. Hall and David Soskice (eds) *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press, 145–183.

Feenstra, Robert C, Robert Inklaar and Marcel P Timmer (2015) The Next Generation of the Penn World Table. *American Economic Review* 105(10): 3150–3182.

Galor, Oded and Joseph Zeira (1993) Income Distribution and Macroeconomics. *Review of Economic Studies* 60(1): 35–52.

Heckman, James J and Bas Jacobs (2010) Policies to Create and Destroy Human Capital in Europe. NBER Working Paper No. 15742. Available at http://www.nber.org/papers/w15742.pdf

Iversen, Torben and Anne Wren (1998) Equality, Employment, and Budgetary Restraint: The Trilemma of the Service Economy.*World Politics* 50(4): 507-546.

Iversen, Torben and David Soskice (2006) Electoral Systems and the Politics of Coalitions: Why some democracies redistribute more than others. *American Political Science Review* 100(2): 165–181.

Iversen, Torben and John D Stephens (2008) Partisan Politics, the Welfare State, and Three Worlds of Human Capital Formation. *Comparative Political Studies* 41(4–5): 600–637.

Kenworthy, Lane (2004) *Egalitarian Capitalism: Jobs, Incomes, and Growth in Affluent Countries*. New York, NY: Russell Sage Foundation.

Kleider, Hanna (2015) Paid and Unpaid Work: The impact of social policies on the gender division of labour. *Journal of European Social Policy* 25(5): 505–520.

Krugman, Paul (1997) *The Age of Diminished Expectations: U.S. Economic Policy in the 1990s*. 3rd edition. Cambridge, MA: MIT Press.

Krugman, Paul and Robin Wells (2005) *Macroeconomics*. New York, NY: Worth Publishers.

Lucas, Robert E, Jr (1988) On the Mechanics of Economic Development. *Journal of Monetary Economics* 22(1): 3–42.

Morgan, Kimberly J (2012) Promoting Social Investment through Work–Family Policies: Which nations do it and why? In Morel Nathalie, Bruno Palier and Joakim Palme (2012) (eds) *Towards a Social Investment Welfare State?: Ideas, Policies and Challenges*. Bristol: The Policy Press, 153–179.

OECD (2002) Economic Surveys: Netherlands. Paris, France: OECD. Availble at: http://www.oecd.org/eco/surveys/Netherlands-2016-overview.pdf

OECD (2003) *The Sources of Economic Growth in OECD Countries*. Paris, France: OECD.

OECD (2007) *Employment Outlook*. Paris: OECD.

OECD (2010a) A Family Affair: Intergenerational Social Mobility across OECD Countries. In *Economic Policy Reforms: Going for Growth*. Paris, France: OECD, 181–198.

OECD (2010b) The High Cost of Low Educational Performance: The Long-Run Economic Impact of Improving PISA Outcomes. Paris, France: OECD. Available at: https://www.oecd.org/pisa/44417824.pdf

Ornston, Darius (2013) Creative Corporatism: The politics of high-technology competition in Nordic Europe. *Comparative Political Studies* 46(6): 702–729.

Pontusson, Jonas (2005) *Inequality and Prosperity: Social Europe vs. Liberal America*. Ithaca, NY: Cornell University Press.

Romer, Paul (1990) Endogenous Technological Change. *Journal of Political Economy* 98(5): S71-S102.

Wren, Anne (ed.) (2013) *The Political Economy of the Service Transition*. Oxford: Oxford University Press.

Wren, Anne, Mate Fodor and Sotiria Theodoropoulou (2013) The Trilemma Revisited: Institutions, Inequality, and Employment Creation in an Era of ICT-Intensive Service Expansion. In Wren, Anne Wren (ed.) (2013) *The Political Economy of the Service Transition*. Oxford: Oxford University Press, 108–146.

Author biography

Takayuki Sakamoto is a professor of political science at the University of Kitakyushu, Japan. He studies comparative political economy of industrial countries. He is the author of *Economic Policy and Performance in Industrial Democracies: Party Governments, Central Banks, and the Fiscal–Monetary Policy Mix* (Routledge, 2008) and *Japan since 1980* (Cambridge University Press, 2008, with Thomas F. Cargill). He has published in *Comparative Political Studies*, *European Journal of Political Research*, *Party Politics*, and others.