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The gendered employment gains of investing in social vs. physical infrastructure: evidence from simulations across seven OECD countries

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IDII: International Development & Inclusive Innovation Research Network

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- Institute for Innovation Generation in the Life Sciences (Innogen)
- International Development Office (IDO).

The gendered employment gains of investing in social vs. physical infrastructure: evidence from simulations across seven OECD countries

Jerome De Henau and Susan Himmelweit

Abstract

Public spending on social infrastructure is usually seen as a cost rather than an investment, and not considered for investment-led Keynesian stimulus policies, despite having long-term economic and social benefits. This paper simulates and compares the (gendered) total employment effects of investing in the care and construction industries, as examples of social and physical infrastructure respectively, across seven OECD countries. Our simulations show that investment in care generates more total employment, including indirect and induced employment, than investment in construction, especially for women, and almost as much employment for men. This structural difference remains, though is somewhat reduced, if the analysis is conducted in FTEs with wages in care matched to those in construction. Further, the fiscal returns from investing in care are higher, allowing greater investment for the same net cost. Equalising *net* spending therefore gives investing in care a further advantage in employment creation over investing in construction.

Keywords: gender equality, investment, social infrastructure, care, employment
JEL: C67, H54, J16

Introduction

Public investment is needed in social as well as physical infrastructure (Elson and Pearson, 2015; Himmelweit, 2016; Ilkkaraçan, 2013, 2017; Onaran, 2017). "Social infrastructure" refers to the human and social capital produced by the education, health and care services that reproduce the economy and its workforce. For a Keynesian-inspired stimulus, only "physical

infrastructure" investment, such as constructing housing, roads and bridges, tends to be considered. However, both types of infrastructure provide public good benefits. As such, both require public intervention, because with social benefits greater than their private benefits, both will be underprovided if provision is left to market forces alone.

The 2007-08 financial crisis led to some public investment to stimulate economies, before subsequent fiscal retrenchment heavily restricted public spending (Ganelli and Trevala, 2016; Truger, 2016). Care services, neglected even before the crisis, were cut in many countries despite fast rising demand, leading to a 'care deficit', with damaging consequences for well-being. While investment in the construction sector was seen as productive and worthy of taxpayers' money, investment in care was presented as a cost whose funding should be contained (Elson, 2016). There was little or no gender impact analysis of such spending priorities, and little notice taken of empirical studies demonstrating the advantages of investing in care over investing in construction, in terms of both short-term employment creation and gender equality effects (Antonopoulos and Kim, 2011; Ilkkaraçan et al., 2015; De Henau et al., 2016).

Building on earlier work (De Henau et al., 2016), this paper compares the (gendered) total employment effects of investing in the caring and construction industries, as examples of social and physical infrastructure respectively, across seven OECD countries. The simulations show that, including indirect and induced employment effects, more employment in total, and especially for women, would be generated by investment in the caring industries. Further, the number of jobs generated for men would be almost as large as for investing in construction.

Perhaps these results could be explained by lower average wages and working hours in care than in construction found in nearly all countries. If these fully explained the additional employment generated, then investing in care would be a questionable gender equality policy that could work only by generating more poor-quality jobs for women. So, we additionally calculate our results in terms of full-time equivalent employment and reinvestigate employment generation after equalising wages in the two sectors. Although removing differences in hours and wages reduces the difference in employment generated, the conclusion remains robust that care generates superior employment results.

Some of the costs to the government of investing in either sector will be recouped through increased tax revenue from newly employed workers; more will be recouped the greater the employment created, reducing the net cost of the investment. We therefore also compare the level of employment creation by investment in the two industries for the same *net* cost.

The next section examines the gender biases inherent in the neglect of social infrastructure in public investment priorities and why that matters in the context of fiscal consolidation. We then go on to explore existing empirical evidence of the potential (gendered) employment gains from investing in social infrastructure, before describing our own comparative empirical approach and considering the factors that might explain our results. The following section outlines the simulation method and data we have used, before giving results that include some additional simulations to investigate how far differences in working hours or wage levels explain our results. The penultimate section examines fiscal effects, before the conclusion considers implications for investment policy as well as further research that might strengthen such a policy case.

The neglect of social infrastructure in gender-biased investment policies

Conventionally, a national infrastructure programme entails spending on physical construction projects such as roads, railways, telecommunications, hospitals, schools and green technologies (Skidelsky and Fraccaroli, 2017; IMF, 2014). While any expenditure will boost an economy operating below full capacity, the argument for delivering that boost by public investment in infrastructure is that it both has long-term benefits and, because those benefits have a public good character, is unlikely to be funded by private investors.

Both points also apply to what we call "social infrastructure", the human and social capital that is produced and maintained by caring services, health and education. Spending on these industries can be an investment when, like physical construction, it contributes to building a stock of capital, in this case human and social instead of physical capital, whose use leads to benefits for the future. Further, human and social capital also resembles physical infrastructure in that it benefits not only those who use it directly, but society as a whole. And, like physical infrastructure, human and social capital tend to be underprovided if left

purely to private investment. We therefore have public health, education and, increasingly, child and elder care systems, and it is reasonable to see much spending on them as investment in our "social infrastructure".[1]

In the 1990s, public spending on education and health began to be recognized as a form of social investment in workers' productivity and thus the productive capacity of the economy. Governments began to describe their role as enabling a 'social investment state' that by fostering employability skills and opportunities would increase productivity (Morel and Palier, 2011). Public spending on childcare was supported on similar grounds: but here the productivity gains were not only from children in the future, but also from mothers retained in the labour force continuing to use their skills (Jenson & Saint-Martin, 2003; Bonoli & Natali, 2012; European Commission, 2013).

This argument is rarely made about public spending on elder care, even though having fewer employment interruptions for carers and worries about their relatives' care is likely to make those workers more productive, as is not having concerns about their own future well-being. However, the argument that expenditure on preventative health and social care is an investment in future well-being that reduces the need for future public expenditure has gained ground over the past decade (Brouselle et al. 2016; Gaughan et al., 2015; Lopes, 2017).

Nevertheless, despite the expected impact on the economy and public finances, and the rhetoric of 'social investment', internationally agreed fiscal accounting methods treat physical and social infrastructure quite differently, with far-reaching funding implications. Spending on social infrastructure remains classified as 'current' rather than 'capital' expenditure in the national accounts (United Nations, 2009; Elson, 2017). The international System of National Accounts (SNA) considers spending on physical infrastructure alone as 'gross capital formation', its term for investment. The SNA counts only what is transferable to others as having value and contributing to GDP; it therefore does not value, or even recognise, human and social capital. As a result, the SNA classifies expenditure on the construction of schools, hospitals, care homes and nurseries, including on the wages of the

[1] This definition of "social infrastructure" differs from that used by many, such as the European Commission, who use it to refer to the physical infrastructure required for social services, thus school and hospital buildings (Fransen et al., 2018). In our definition, social infrastructure is the human and social capital that such services themselves build.

building workers, as capital expenditure. However, expenditure on what is done in these facilities, which largely goes on the wages of teachers, doctors, nurses and care workers, is classified as current expenditure.

The SNA distinction between capital and current spending matters because governments' rules and practices tend to be more tolerant of deficits incurred through making capital rather than current expenditure (Truger, 2016). This attitude is, at least in part, based on the premise that the former creates assets that generate revenue (often from increased economic activity) which can help pay off any resultant debt. Thus, the rigid criteria of the European Union's Stability and Growth Pact, for example, can be relaxed for investment purposes (IMF, 2014; OECD, 2017). Logically such "investment" should include spending on social infrastructure too, since such spending also generate assets: a well-functioning society and a healthy, well-educated population, both increasing productivity and generating future revenue (or, in the case of preventative investment, reducing the need for future spending).

Yet, despite the rhetoric of social investment, the economic and fiscal returns of spending on social infrastructure are hardly recognized. A blog arguing for investing in transport infrastructure, illustrates the point (Tweedale, 2018):

> ". . . we need a government that is focused on generating long term wealth through a strong economy, one that doesn't automatically divert funds to short term fixes to meet the raised voices calling for more money for the NHS [the National Health Service]. . . . my concern is that if we don't think and act to build long term wealth, we won't have the economy to generate the money to pay for the NHS . . ."

That health spending is seen as a 'quick shot-term fix' that has to be paid for by 'the economy', rather than building 'long term wealth', denies the role of social infrastructure in making the people more effective in generating such wealth.

Failure to recognise social infrastructure spending as investment, is consistent with a more general pro-market bias in what constitutes an economic gain, with contributions to GDP alone being counted, excluding those to any more inclusive concept of well-being. There is a related pro-market bias in how investment projects are appraised, with time that is priced through the wage being counted, while unpaid labour time is not. Economic assessments of

the value for money of social infrastructure spending, using standard accounting methodology, tend therefore to ignore the opportunity cost of unpaid care (Streeck and Mertens, 2011), reducing how effective such spending appears. As a consequence, social infrastructure services are seen as a drain on the public finances, leading to sub-optimal provision, and continual pressures to reduce costs, thereby reinforcing the need for unpaid domestic substitutes (Seguino, 2010).

Both those pro-market biases are also gender biases, in that women, by their greater contribution than men to unpaid care, are more likely both to make contributions to well-being not valued by the market and to have their labour time uncosted by it (Balakrishnan et al., 2016). There is also a gender bias in those who benefit from investment in physical versus social infrastructure. Continuing gender divisions in the roles of men and women, particularly with respect to care, lead women to make more use of healthcare, care and education services for themselves or for those for whom they care, while men, freed of such caring responsibilities, make more use of physical infrastructure, such as roads and railways (Gill, 2018). Further, where both private and public services exist alongside each other, publicly provided services are more likely to be used by women, because of their lower incomes on average, often consequent upon current or past caring roles.

Finally, competing spending priorities that favour physical infrastructure also create a gender bias in the employment opportunities generated, since in most countries physical infrastructure projects tend to employ mainly men, while social infrastructure services employ more women. It is this particular gender bias that the remainder of this paper investigates.

Employment effects of social infrastructure investment

Measuring the longer-term social and economic benefits of investing in social and physical infrastructure is difficult and subject to both methodological and conceptual challenges. However, the case for such investments is strengthened by any short-term employment opportunities they create, and further strengthened if they thereby reduce gender inequalities.

While such supply-side benefits of investing in care have been investigated at length (Ilkkaraçan, 2017), only a few studies have analysed the demand side employment creation effects of spending on care (see Ilkkaraçan, 2017, for a review; ILO, 2018; De Henau, 2019), and not many of these compare those effects with those of spending on other sectors. The German Ministry for Economic Affairs examined the impact on a range of economic indicators of staged annual investment in a range of sectors (including 'physical infrastructure' and 'all day school/childcare'). On all indicators investment in all day school/childcare outperformed investment in physical infrastructure, by generating more employment and greater fiscal returns (Krebs and Scheffel, 2016).

A method of investigation developed by the Levy Economics Institute, close to that of this paper, but simulating just direct and indirect employment effects, was used to compare the (gendered) employment generated by investment in care and in construction, as examples of industries that produce social and physical infrastructure respectively, for South Africa and the United States (Antonopoulos and Kim, 2011) and Turkey (Ilkkaraçan et al., 2015). In all three countries, investment in care generated far more employment, the majority of which went to women, whereas investment in construction resulted in fewer jobs, with more going to men.

This paper expands on these studies by (i) including induced employment effects and doing so cross-nationally, (ii) examining how far any difference in employment effects is due to differences in industries' working hours or wages and (iii) taking account of the fiscal revenue generated by employment creation to compare the employment effects of investments of similar *net* annual cost.

Empirical approach

Our comparative analysis examines seven OECD countries, namely, Australia, Denmark, Germany, Italy, Japan, the UK, and the USA, chosen to cover a variety of welfare systems, and differences in the level, quality and type of care provisioning.

Table 1 shows that public spending on care services varies greatly between the seven countries, reflecting different priorities of their welfare regimes.

Table 1 Public spending on care services (% GDP – circa 2011)

	Childcare services	Long-term care services
Australia	0.38	0.80
Denmark	1.51	2.35
Germany	0.49	1.02
Italy	0.62	1.04
Japan	0.13	1.87
United Kingdom	0.44	1.42
United States	0.37	0.57

Source: Authors' calculations based on OECD (2019) and De Henau et al. (2016)

Table 2 shows that the countries also vary in the relative importance of care and construction to employment, and in the working hours, gender composition and pay in the two industries, with workers in the care industry the more likely to be part-time, women and paid lower wages (the latter except in Japan). Self-employment is more prevalent in construction than in care, especially in the UK.

In order to make meaningful cross-country comparisons, we estimate the employment impact of investing 1% of GDP in the care and construction industries in each of our countries. We give the impact on employment broken down into direct, indirect and induced effects, as well as the gender breakdown of each of these effects.

"Direct employment effects" capture the employment created in the industry in which the investment takes place. Investment in any industry will generate additional employment as demand is increased for the products of its suppliers. Such demand will ripple down the supply chain, generating "indirect employment effects". Besides these indirect effects there are also "induced employment effects" as a result of the additional household income generated by the additional employment. Some of this additional household income will be spent and become a further source of increased demand within the economy, generating jobs in the sectors in which households spend their income.

Table 2 Employment structure in care and construction

	Total employment (000s)	% of total employment		% of FTEs / Headcount (HC) jobs		% women (HC)		Wage cost per FTE (relative to average wage cost)		% employees (HC)	
	All	Cons	Care	Cons	Care	Cons	Care	Cons	Care	Cons	Care
Australia	12,463	8%	4%	93%	76%	11%	79%	117%	114%	75%	96%
Denmark	2,756	6%	12%	79%	63%	10%	82%	90%	85%	89%	100%
Germany	38,702	7%	5%	94%	80%	13%	75%	79%	70%	81%	91%
Italy	22,513	8%	2%	97%	90%	6%	85%	76%	69%	62%	85%
Japan	66,569	9%	4%	91%	81%	14%	77%	72%	81%	71%	99%
UK	28,873	8%	6%	96%	81%	11%	80%	99%	44%	61%	92%
USA	182,278	5%	4%	-	-	13%	81%	115%	50%	65%	84%

Source: De Henau et al. (2016). HC stands for headcount (persons) and FTE for full-time equivalents. FTE data not available for the USA. Wage cost is measured by the total compensation of employees (= gross earnings + employers' social security contributions) per FTE employee in the industry as % of the national average.

There are a number of factors that might explain why total employment creation from investing the same amount in the two industries might be differ:

(i) Structural: the industries and their suppliers might differ in their labour intensity and/or the extent to which they use imported inputs directly and indirectly;
(ii) Working hours: the industries and their suppliers may differ in their typical hours of employment, so that the same number of working hours results in different number of jobs being created;
(iii) Wages: the two industries and their suppliers may pay different wages.

Which factor lies behind any differences in employment effects matters. If greater employment effects are found simply because wages are worse or hours shorter in one industry, then it begs the question of whether investment in it is simply expanding poor employment conditions. It is therefore important to consider whether the greater employment

effects of investing in a particular industry would remain even if conditions in that industry were improved.

Our first estimations are of the differences in the headcount employment effects of investing in the two industries, in which the contributions of factors (i) – (iii) are not distinguished. Subsequent estimations show how far any differences would be reduced if working hours and wage costs were equalised between the two industries (so that factors (ii) and (iii) did not apply). This leaves structural differences in labour and import intensity as the explanation of any remaining differences in employment effects. If these remain substantial, then improving working conditions in a lower-paying, but greater employment-generating industry, potentially a necessary condition for recruiting enough workers, reduce but do not undermine the case for investing in it.

Methods and data

This paper uses standard input-output multiplier methods to investigate the effect of increasing the demand and thus output of a single industry. Such methods assume that the physical input and employment requirements per unit of each industry's output remains unchanged, as do all prices and wages. Input-output tables show how much (in price terms) each industry's production process uses the output of every industry (including its own) as inputs.

The direct employment effect of increases in the output of an industry is calculated from that industry's labour input per unit of its output. I-O tables can then be used to calculate total input requirements down the supply chain and thus the *Type I employment multiplier* (directly and indirectly generated employment per additional worker directly employed).[2]

We use a similar process to calculate the *Type II employment multiplier* that also includes the "induced" employment effect of the increased earnings of the newly employed. To do this, households are effectively treated as another industry, whose inputs are given by the spending of households on the outputs of each other industry. Augmented I-O tables can then be used to calculate total employment generated including "induced" employment. Doing so assumes

[2] See Scottish government (2015) for more details on how multipliers are calculated using input-output tables.

additionally that the proportions in which households spend their total resources (both earned and unearned income) are unchanged (Scottish government, 2015).

Our calculation of induced effects does not include the effect of increased spending by the newly self-employed owing to lack of data on their income. Induced effects are therefore somewhat underestimated, and more so for investment in construction than in care, given the larger prevalence of self-employment in the former (Table 2).

That various ratios in production remain unchanged, in particular, that increasing demand for an industry does not change its production methods and the wages that it pays, is a strong but usual assumption in such analysis. However, the additional assumption required for calculating induced employment effects, that a policy that increases demand in one industry does not change the pattern of household spending, needs justification. For construction, it is not unreasonable; public construction projects are typically different from those on which households spend their income.[3] However, in the absence of public provision, some households spend money buying care that they may not need to once provision is publicly funded. So, to justify assuming unchanged household spending patterns, we should see the investment being modelled as providing publicly funded care services, but with a financial contribution required from households equal to the household sector's current spending on care.

We estimate gendered employment effects by assuming that current gender employment ratios by industry do not change as a result of such investments, again a strong assumption, but plausible given similar results obtained with more refined job-matching methods by Antonopoulos and Kim (2011) and Ilkkaraçan et al. (2015).

Data for input-output tables are derived from the national accounts and employment data from official labour force surveys, both provided by national statistical offices and Eurostat. The reference year is 2010 for Italy, Germany and the UK, 2011 for Denmark and Japan and 2013 for the USA and Australia.

[3] Spending might change as a result of the construction, but typically not while the investment in construction is being made, which is what matters here.

Results

Table 3 shows the direct, indirect and induced employment effects of a 1% of GDP investment in the care and construction industries. For comparative purposes, we report the number of jobs generated relative to the working-age population, i.e. by the rise in the employment rate.

Table 3 Rise in employment rate (% points) from investment of 1% of GDP in construction and care industries

	Construction				Care				Ratio of effects Care/Construction			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Australia	0.2	0.4	0.2	0.9	1.2	0.1	0.4	1.7	4.7	0.3	1.9	2.0
Denmark	0.4	0.3	0.1	0.8	1.3	0.1	0.2	1.6	3.1	0.5	1.7	2.0
Germany	0.5	0.3	0.2	0.9	1.4	0.2	0.3	1.9	2.8	0.7	1.6	2.0
Italy	0.3	0.4	0.1	0.8	0.8	0.3	0.2	1.2	2.4	0.7	1.6	1.5
Japan	0.7	0.4	0.3	1.4	1.0	0.2	0.4	1.7	1.5	0.6	1.2	1.2
UK	0.4	0.3	0.2	0.9	1.0	0.7	0.2	1.9	2.5	2.2	1.4	2.2
USA	0.6	0.3	0.6	1.5	1.7	0.3	0.8	2.7	2.7	0.9	1.3	1.8

Source: authors' calculations

Table 4 shows gendered employment effects by the percentage of jobs created that would be filled by women.

Table 4 Percentage of new jobs filled by women by investment in construction and care industries

	Construction				Care			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Australia	11%	32%	50%	32%	79%	43%	50%	68%
Denmark	10%	32%	44%	26%	82%	41%	44%	69%
Germany	13%	33%	51%	28%	75%	50%	51%	67%
Italy	6%	24%	44%	21%	85%	53%	44%	70%
Japan	14%	33%	46%	29%	77%	41%	46%	62%
UK	11%	23%	46%	24%	80%	67%	46%	69%
USA	13%	37%	52%	35%	81%	43%	52%	67%

Source: authors' calculations

Direct effects

Table 3 shows that the direct employment effect of investing in care is considerably larger than that of investing in construction in all countries. The ratio of employment created in the two industries varies from less than twice as many in care as in construction in Japan to nearly five times as many in Australia. Both these industries are highly gender-segregated – construction even more so than care – so that of the jobs directly generated, only 6-14% would go to women in construction, but 75-85% of the jobs in care. In Italy the direct impact of investment in care appears lower than in other countries, where it is unlikely that the data used fully captures the well-known "grey economy" of migrants in Italy's social care system, leaving formal care provision geared towards less labour-intensive residential nursing care (Mingione, 2009; OECD, 2011).

Indirect effects

Table 3 shows that in all countries except the UK, indirect job creation is greater if the investment is made in construction than in care. This is consistent with construction using more inputs provided by other industries than the more labour-intensive care industry.

However, the greater indirect employment effects of investing in construction do not outweigh the greater direct effects of investing in care, so the total Type I effect, the sum of direct and indirect employment effects remains larger for investment in care.

Again, the size of the indirect effect varies across countries, with the UK an outlier for care, and Australia for construction. More detailed calculations show that two thirds (65%) of the UK care industry's large indirect effect is within the care sector itself, which means its indirect employment effect on other industries, at 0.2% points, is similar to that of other countries. This is consistent with the care sector in the UK outsourcing a particularly large proportion of its inputs within itself due to the intense local commissioning of private long-term care by public authorities. This also explains why the UK's direct employment effect in care relatively low. The total within-industry effects (both direct and indirect) for the UK at 1.4% points is in the middle of its range over the countries studied. The other outlier is Australia, whose construction sector generates particularly large indirect employment effects (and the lowest direct employment effect), reflecting both outsourcing to specialised trades in other industries and sub-contracting between firms within the construction sector (Toner, 2006).

The indirect employment generated by investment in construction, like the direct employment, is also male-dominated (Table 4). However, the indirect employment generated by investment in care is not in general female-dominated. The argument that investing in construction infrastructure provides jobs for all – through indirectly generating jobs going to women as much as to men – is not supported by our results. But the (reverse) argument holds up better for care; although the direct jobs generated by investment in care are female dominated, the indirectly generated jobs in general favour men.

Induced effects

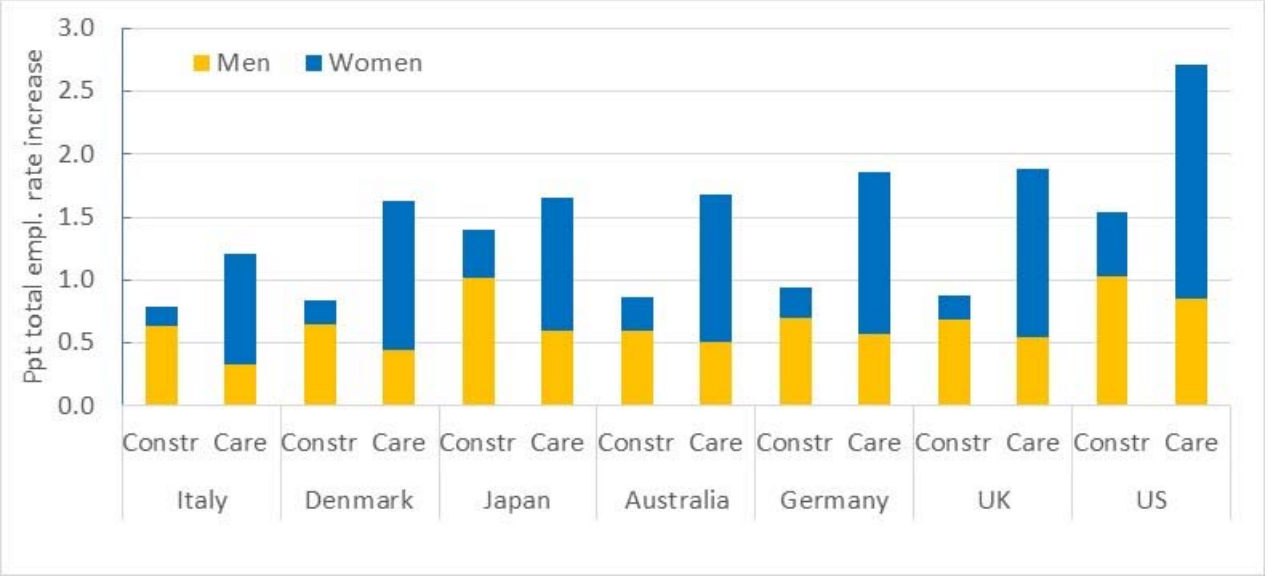
The induced effects of investment in the care sector are larger than those for the construction sector. This reflects higher additional earnings due to a larger Type II employment effect failing to outweigh generally lower wages in direct employment in care. That the gender breakdown of the induced employment effects is estimated to be the same for both industries is a consequence of our method of treating the household sector like an industry, which

entails the assumption that the proportions in which households spend their income do not vary.

Total effects

Summing the direct, indirect and induced employment effects, Table 3 and Figure 1 show that a much greater number of jobs are created overall (at least 50% more - except in Japan) by investment in care.

Figure 1 Contributions of men and women to total employment rate increase



Source: authors' calculations (countries ranked by total employment generated by investment in care)

Further, investment in care creates more jobs for women. However, because it creates so many more jobs overall, in most countries it is only slightly less effective than investment in construction in creating jobs for men (in the US, UK, Germany and Australia less than 20% fewer jobs). Therefore, investment in construction, one of the sectors likely to be thought about for an employment stimulus, is not the most effective way to boost overall employment, is far less effective for women's employment and only somewhat more so for men's. Indeed, investment in construction increases the gender employment gap, while investment in care decreases it.

Additional simulations

Working hours

To assess the extent to which different working hours in the care and construction industries contribute to our results, we repeated our simulations in terms of full-time equivalent (FTE) employment. Table 5 gives the ratio of employment effects both in FTEs and in headcount numbers (from Table 3), for every country except the USA, for which data on FTEs is not available.

Since the method of analysis necessarily makes the two industries' induced effects of identical composition their ratio is unchanged by switching to FTEs, but for direct and indirect effects the ratio is reduced, reflecting lower average hours worked in care than construction (Table 2), and to some extent in their supplying industries too. However, even in FTE terms investment in care generates far more employment than investment in construction. So, the differential effect, although reduced, cannot be attributed to differences in working hours alone.

The last panel of Table 5 shows the effect of considering employees only (a necessary benchmark for the wage adjustment simulations carried out in the next section). Reflecting the larger proportion of employees in care than in construction (Table 2), the ratios of direct employment effects of investment in care relative to construction increase sharply, but less so for total effects (there is little change in indirect effects, and none in induced effects because in both estimations of the latter we have data on the additional income of only employees).

Table 5 Ratio of employment effects (care/construction) in headcount and FTE employment and employees

	Ratio of headcount employment effects (care/construction)				Ratio of FTE employment effects (care/construction)				Ratio of FTE employee effects* (care/construction)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Australia	4.7	0.3	1.9	2.0	3.8	0.3	1.9	1.7	4.8	0.3	1.9	1.9
Denmark	3.1	0.5	1.7	2.0	2.4	0.4	1.7	1.7	2.9	0.4	1.7	1.8
Germany	2.8	0.7	1.6	2.0	2.4	0.7	1.6	1.8	2.6	0.7	1.6	1.9
Italy	2.4	0.7	1.6	1.5	2.3	0.7	1.6	1.5	3.1	0.7	1.6	1.8
Japan	1.4	0.6	1.2	1.2	1.3	0.6	1.2	1.1	1.5	0.5	1.2	1.2
UK	2.5	2.2	1.4	2.2	2.1	2.0	1.4	1.9	3.2	2.3	1.4	2.5
USA	2.7	0.9	1.3	1.8	-	-	-	-	3.5	0.8	1.3	2.0

Source: authors' calculations. (*Headcount employees for USA)

Wages

To assess the extent to which different wages paid in the two industries contribute to our results, we have repeated our analyses assuming that wages in the two industries are the same, specifically that workers in care are paid the same as those in construction. In this section we estimate the result for full-time equivalent employees only, since deriving self-employment income was not possible from the input-output information available.

As Table 2 shows, except in Australia and the USA, neither industry pays above the average wage, but in all countries except Japan, construction workers are paid more than care workers, and in all except Australia, care workers are paid less than the average wage.

Working out the effect of matching wages in care to those in construction on employment generation requires calculating anew:

(i) direct employment effects, because higher wages will affect the price of care and hence how much can be purchased by a given sum of money; direct employment will be reduced by a factor that is less than proportional to the rise in wages.

(ii) employment multipliers; the same inputs will be needed per worker in care, so the Type I multiplier will not change, but the rise in earnings of care workers will change the Type II multiplier.

The detail of the calculations and implicit assumptions made are provided in the Appendix.

The last panel of Table 6 shows that in most countries, matching wages in care to those of construction reduces the total employment generated by investing in care by 7% or less. Indeed, it increases employment slightly in Japan, where wages in construction are lower than those in care, as would be expected. The two exceptions with a larger impact on employment creation are the UK and the USA, the countries in which care workers are exceptionally badly paid. Even in those countries, the more than doubling of wages in care needed to match those in construction reduces total employment creation by less than a third. In all countries, except Japan there is a loss in the direct and indirect jobs created (and therefore in the quantity of care provided), but this is partly compensated by additional induced employment due to the higher wages, so that care continues to outperform construction in total employment creation by at least a quarter in all countries and by at least two thirds in most.

Table 6 Ratio of increase in FTE employees (care/construction), before and after matching wages in care to those of construction

	Ratio of increase in FTE employees†, before wage match (Care/ Construction)				Ratio of increase in FTE employees†, after wage match (Care/ Construction)				% change in employment effects from wage match			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Australia	4.8	0.3	1.9	1.9	4.7	0.3	1.9	1.9	-2%	-2%	0%	-2%
Denmark	2.9	0.4	1.7	1.8	2.7	0.4	1.7	1.8	-5%	-5%	1%	-4%
Germany	2.6	0.7	1.6	1.9	2.4	0.6	1.6	1.8	-8%	-8%	2%	-7%
Italy	3.1	0.7	1.6	1.8	3.0	0.7	1.6	1.7	-5%	-5%	3%	-4%
Japan	1.5	0.5	1.2	1.2	1.6	0.6	1.2	1.3	9%	9%	-2%	6%
UK	3.2	2.3	1.4	2.5	1.9	1.4	1.6	1.7	-40%	-40%	15%	-33%
USA	3.5	0.8	1.3	2.0	2.0	0.5	1.4	1.4	-43%	-43%	11%	-29%

† For USA, headcount employees. Source: Authors' calculations

Removing those other influences suggests that the additional employment effects of investing in care over those of construction must be structural, a result of differences in the labour and import intensity of the two industries. Even when wages are equalised and FTEs counted, care outperforms construction in job creation. It is therefore a better candidate for employment stimulus in times of less than full employment.

Effects on fiscal revenue

Even when employment levels are high, investing in care can expand the economy because, as well as increasing the demand for labour, investing in care increases its supply by freeing up those previously engaged in unpaid care to take employment or increase their working hours. This is not the case for construction jobs.[4] Estimating the size of such an increase in labour supply has to be country-specific since it will depend on specific national care systems, the size and quality of the care investment relative to unmet need, who is currently performing unpaid care and on how likely they are to take employment if other forms of care are available.

[4] While new physical infrastructure such as a bridge may also subsequently enable some people to take jobs that they could not previously, the labour supply is not expanded during its construction.

Any jobs that are filled by people previously not in employment, whether through unemployment or care responsibilities, will reduce the net cost of the investment in care through generating tax revenues and reducing claims for social security benefit. Tax and benefit systems are highly country-specific, so net revenue effects are hard to estimate cross-nationally, but a rough estimate of average wages and thus average tax due for each country can be calculated. For each country, Table 7 shows the tax wedge, the total income tax and social security contributions paid by an employee and their employer, divided by the total wage cost (gross earnings + employer's social security contributions) at average wages. This can be used roughly to estimate total income tax and social security contributions from the new jobs created.

Table 7 Short-term fiscal effects of investing in care and construction (FTE employees at matched wages)

	Tax wedge at average wages	Net cost as percentage of gross cost		Ratio (Care/ Construction) of increase in FTE employees†, matching	
		constr.	care	gross spending	net spending
Australia	27%	85%	70%	1.9	2.3
Denmark	37%	79%	65%	1.8	2.2
Germany	49%	72%	54%	1.8	2.3
Italy	47%	79%	67%	1.7	2.0
Japan	31%	76%	71%	1.3	1.4
UK	33%	82%	70%	1.7	1.9
USA	31%	71%	58%	1.4	1.7

Source: authors' calculations

The tax wedge reduces the net cost of any investment in an industry. Table 7 shows that the net cost of an investment in construction ranges from 71% of its gross cost in the USA to 85% in Australia, and for care, in the case where wages are equal to those in construction, from 54% in Germany to 71% in Japan. These relatively lower net costs mean that between 29% and 46% of the gross spending in care is recouped in revenue from income tax and social security contributions.

This comparative ‘fiscal advantage’ of care over construction means equalising *net* spending gives investing in care a further advantage in employment creation over investing in construction. As Table 7 shows, equalising net spending in this way raises substantially the ratio of total FTE jobs created. In all countries, except Japan and the US, spending the same net amount on care as on construction would yield close to twice as many jobs in total.

However, if the economy is at full capacity, many jobs created in construction will be filled by existing workers, reducing the revenue gain, so gross and net spending will not differ much. By contrast, because investment in care frees up unpaid carers to take at least some of the new jobs created, then more of the full revenue gain can be expected to be realised.

Conclusion

Conventionally, governments wishing to boost the economy tend to invest in physical infrastructure, seeing such investment as a means of raising employment in the short-term that also generates longer-term economic prosperity. Such thinking tends to see spending on care and other forms of social infrastructure as an unproductive cost, rather than as making an investment in the economy and its long-term future. In many countries, this sector is targeted for cuts in times of fiscal consolidation.

This paper has shown that greater employment gains can be made by investing in social infrastructure, and specifically in the care industry. Further, the employment gains of investing in care are not reliant on unemployment, because care services enable unpaid carers to take employment and thus expand the labour supply. This is not a feature of most physical infrastructure investment.

Even accounting for the shorter hours and lower wages paid in the care industry, investment in it still produces more jobs overall than investment in construction, owing to structural differences between the two sectors: care is a more labour-intensive and less import-intensive industry than construction. Investment in care also yields far more employment for women and not substantially less for men, reducing the gender employment gap, whereas investment

in construction increases it. Further, the fiscal returns from investing in care are higher, allowing greater investment for the same net cost.

Now that, after years of austerity, expansionary public investment-led fiscal policies are being considered, such results need to become more widely known. At the very least our results show that governments and international institutions, such as the IMF, the OECD and the World Bank, would benefit from conducting gendered employment analyses of such policies. Social infrastructure investment policies should be considered on an equal basis with physical infrastructure programmes, and where the latter are still implemented, they should be complemented by policies to mitigate their adverse effects on gender employment gaps.

Further research at the country level could establish more refined employment characteristics of the jobs created, such as their wage distribution, include consideration of the earnings of the self-employed and more detailed analysis of the fiscal impact of any such investment. De Henau (2019), for example, calculated that for the UK investing in high quality free universal childcare, while costing 3.1% of GDP annually, would recoup that total cost in fewer than ten years from the increased maternal employment it would enable.

Of course, the case for investing public funds in high quality care services does not rely solely on the employment it creates, or even its beneficial effects on gender employment gaps. Public investment in care is required to support those in need of it, children and frail elderly alike, and to alleviate and support the unpaid work of their parents and carers. While children come in both sexes, the majority of those in need of long-term care are women, as are most of those providing unpaid care, making this a gender equality issue too (OECD, 2011).

Longitudinal estimations of the economic and social benefits of such policies would strengthen the case. But these will also require different measures that better capture the benefits of a more equal society and improved well-being. Only then will we be able to show how much spending on care is really an investment, adding to well-being while preventing the need for less effective and often more expensive interventions later on.

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Appendix

Calculations of the employment effect of wage adjustments

To work the effect of changing wages in care on employment generation requires calculating changed:

(i) direct employment effects
(ii) employment multipliers

Direct employment effects
To calculate these we have to assume that care is not a significant input into any other industry's production. This assumption is justified by observing that, the maximum proportion of its total input cost spent on care by any other industry is 2.8% in Italy for the healthcare industry, while for most industries it is virtually zero.

Despite the wage change, from W to W', the same amount is invested in care, so the additional output of care O is unchanged in price terms. So (using $'$ to indicate variables whose values may have changed)

$$I + WE = O = O' = I' + W'E' \quad (1)$$

where E is the direct employment generated by the investment in care, W the average wage level in care per FTE, so that WE is the wage component and I the non-wage component of that investment.

Then (using lower case letters for ratios assumed not to change)

$I = I_i + I_p$ where,

$I_p = sO =$ taxes on products and other non-wage components (profits) of value-added in the care industry (assumed a fixed proportion s of the value of output, O) and

$I_i = I_c + I_{nc} =$ cost of intermediate goods used by the care industry, where:

$I_c = dO =$ cost of care as an intermediate good used in the production of O, assumed a fixed proportion d of O, since any change in the price of care will affect care as an output and as an input in the same way

$I_{nc} = bE =$ cost of non-care intermediate goods used in the production of O, assumed a fixed proportion b of E, the newly generated direct employment in care, since the cost of non-care intermediate goods per worker in care should be unchanged because the price of those goods has not changed

So that

$$I = I_c + I_{nc} + I_p = dO + bE + sO$$

(2)

Substituting for I and I' in equation (1):

$$dO + bE + sO + WE = dO' + bE' + sO' + W'E'$$

(3)

but $= O'$, so that

$$E'/E = {(b + W)}\Big/{(b + W')}$$

Thus, if wages change from W to W', direct employment generated is changed by a factor of ${(b + W)}\Big/{(b + W')}$

Indirect and induced effects

As explained in the paper, the Type I multiplier, $1 + M_1$, stays the same, so that

$$M_1' = M_1$$

(4)

To calculate the Type II multiplier, $1 + \mathrm{M}_1 + M_2$, we have to make an additional assumption, that care is not a significant consumer good, so that any change in the price of care does not significantly affect how household income is spent. This assumption is justified by observing that the proportion spent on care by households is greatest at 3.3% in the US, less than 2% in Japan, Australia and Denmark and less than 1% in Italy, Germany and the UK.

Any change in the size of M_2 depends, for each directly employed worker in care, purely on how many directly and indirectly employed workers' pay has changed, and how large that change is. The Type 1 within-care employment multiplier, c, gives the number of workers directly and indirectly employed in care per directly employed worker in care. These are the only workers who receive pay changes.

Then if wages in care change from W to W' (in national currency units)

$$M_2{}' = M_2 + c(W' - W)e$$

(5)

where e is the employment directly generated by households spending an additional unit of national currency (a constant, since the composition of household spending is assumed fixed).