Trends in Women's Employment and Poverty Rates in OECD Countries: A Kitagawa–Blinder–Oaxaca Decomposition

Rense Nieuwenhuis¹ · Wim Van Lancker² · Diego Collado^{3,4} · Bea Cantillon⁴

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Abstract

Although employment growth is propagated as being crucial to reduce poverty across EU and OECD countries, the actual impact of employment growth on poverty rates is still unclear. This study presents novel estimates of the association between macro-level trends in women's employment and trends in poverty, across 15 OECD countries from 1971 to 2013. It does so based on over 2 million household-level observations from the LIS Database, using Kitagawa–Blinder–Oaxaca (KBO) decompositions. The results indicate that an increase of 10% points in women's employment rate was associated with a reduction of about 1% point of poverty across these countries. In part, this reduction compensated for developments in men's employment that were associated with higher poverty. However, in the Nordic countries no such poverty association was found, as in these countries women's employment rates were very high and stable throughout the observation period. In countries that initially showed marked increases in women's employment, such as the Netherlands, Germany, Spain, Canada, and the United States, the initial increases in women's employment rates were typically followed by a period in which these trends levelled off. Hence, our findings first and foremost suggest that improving gender equality in employment is associated with lower poverty risks. Yet, the results also suggest that the potential of following an employment strategy to (further) reduce poverty in OECD countries has, to a large extent, been depleted.

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✉ Rense Nieuwenhuis
rense.nieuwenhuis@sofi.su.se

¹ Swedish Institute for Social Research (SOFI), Stockholm University, Stockholm, Sweden

² Centre for Sociological Research, University of Leuven, Leuven, Belgium

³ Institute for Social and Economic Research, University of Essex, Colchester, UK

⁴ Centre for Social Policy, University of Antwerp, Antwerpen, Belgium

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Introduction

Employment growth is regarded to be one of the most important ways to reduce poverty. In the European Union this is for instance reflected in the 'Social Investment' perspective on policy making, which emphasises government expenditures on policies that allow people to 'prepare' themselves for economic independence through employment (e.g. education, public childcare, and active labour market policies), rather than 'repair' poverty through benefit expenditure (Morel et al. 2012). The social investment perspective is clearly visible in the EU 2020 Growth Strategy, which is the steering wheel for European social and economic integration for the period 2010–2020. In this Growth Strategy, EU countries are supposed to raise employment rates from 69 to 75% and to reduce poverty by 25% (Cantillon and Vandenbroucke 2014). In other OECD countries, such as the United States, the idea that creating jobs is key for poverty reduction is equally widespread (Baker and Bernstein 2014).

Yet, from the mid-1980s, OECD countries did not make much headway in reducing poverty. Despite a nearly continuous dynamic of economic growth, increasing employment rates, and high levels of social spending in the period before the Great Recession, poverty rates for working-age people and for children either rose or stayed stable, with few countries reporting a significant fall (Burniaux et al. 1998; Fritzell and Ritakallio 2010; OECD 2008). Even the famed Scandinavian model has generally been unable to counter this trend: poverty increased significantly in Finland (as well as in Sweden, in more recent years) (Morelli et al. 2015).

In this article, we focus on the association between the marked rise in women's employment across OECD countries and trends in relative income poverty in recent decades. The reasons for our focus on women's employment are twofold. First, most of the growth in employment in these countries has been among women, with men's employment rates being relatively stable or slightly declining. This increase in women's employment was the result of a combination of demographic and institutional developments (Nieuwenhuis et al. 2012), such as women's rising levels of education (Bradley 2000), lower fertility (Van der Lippe and Van Dijk 2002), and the increasing availability of public policies such as paid leave and childcare services (Hegewisch and Gornick 2011; Thévenon and Luci 2012). Second, it has often been overlooked that although women's employment rates have shown marked rises, these trends have levelled off in various OECD countries. For instance, in the United States it was documented how women's employment rates plateaued in the mid-1990s (Cotter et al. 2004; England 2010), and how they showed a negative trend during the first half of the 2000s (Boushey 2008). In the Nordic countries, very stable and high women's employment rates were observed since at least the 1980s. Such levelling of employment rates (at high levels) can have important implications, for they present a limit to the extent further increases in employment could potentially help reduce poverty.

Fig. 1 Percentage point changes in women's employment rates and and poverty rates between mid-1980s and around 2010, 15 OECD countries. . Source: LIS

Since households are consistently found less likely to be poor when at least one household member is employed, and this poverty risk is further reduced for dual earner households (Andreß and Lohmann 2008; Crettaz 2013; Maldonado and Nieuwenhuis 2015), it is often assumed that employment growth and poverty reduction are natural allies. However, what is true at the micro level, is not necessarily true at the macro level. This is illustrated in Fig. 1, showing macro-level changes in women's employment rates and changes in poverty rates for 15 OECD countries between the mid-80s and 2010 (Sweden only had data until 2005). In the majority of countries, a rise in women's employment rates has been associated with an increase in working-age poverty rates.

This paradox between women's employment growth and trends in poverty, with on the micro-level individual women's employment being negatively associated with poverty in their household, but on the macro-level growth in women's employment rates seemingly being associated with rising poverty, suggests that macro-level analyses are ill-suited to assess the impact of women's employment growth on poverty. The reason for this is that such macro-level analyses cannot observe whether the employment growth was among households that as a result of their increased employment were lifted out of poverty, among households that were not poor to begin with, or among households that remained poor despite having increased their employment (Marx et al. 2012). Therefore, based on the presence of such a macro-micro paradox, this association between macro-level trends should be studied using micro-level data. Although many studies have observed that the macro-level relationship between employment and poverty is not self-evident, none of these have been able to link the micro-level

association between employment and poverty to macro-level poverty trends. Moreover, these studies invariably focused on total employment and did not account for the fact that employment growth has generally been a women's affair. Hence, in this study we answer the following question: *How and to what extent are trends in women's employment related to working-age poverty rates in OECD countries between 1971 and 2013?*

By answering this question using an innovative application of the Blinder–Oaxaca decomposition, we contribute to the literature a micro-to-macro analysis of the association between women's rising employment rates and trends in poverty. It should be emphasised that we are not interested in explaining trends in women's employment as such. We are interested in assessing the total impact of rising women's employment on poverty. As will become clear, we will account for the fact that not all employment protects equally well against poverty, but it is beyond the goal and scope of this study to empirically differentiate between types of employment.

To our knowledge, Stier and Lewin (2002) have been the only ones to focus on women's employment and its relationship with poverty outcomes for a single country, Israel. They simulated various scenarios in which non-employed women enter the labour market at different levels of work intensity and numbers of working hours per week. The results suggested that increasing women's employment—even at part-time level—would effectively reduce poverty in society. In discussing these results, Stier and Lewin emphasised the importance of taking account of single-parent families in assessing the impact of employment growth on poverty: while getting female single earner families into the labour market had a poverty-reducing effect, women in couple households entering the labour market had a poverty-enhancing effect through increasing median incomes, albeit not strong enough to offset the poverty reduction gained by working single parent families. Others have applied regression-based simulation techniques to examine the potential impact of attaining the EU2020 employment target (75% of active age people should be in paid employment by 2020) on poverty outcomes in EU countries (Marx et al. 2012). They obtain mixed results: in most countries large employment shifts yield rather small decreases in poverty rates, while in a few countries poverty even increases. They argue that the projected employment growth would benefit the incomes of some households but would cause the (relative) poverty line to shift as well, making others less well off than they were before as a result. This forward-looking simulation exercise was unable to disentangle the actual outcomes of employment growth on poverty outcomes. To do so is the purpose of the present study.

Mechanisms and Hypotheses

The paradox between women's employment growth and trends in poverty, as introduced above, is a typical example of an aggregation paradox (Yule 1903; Simpson 1951). Aggregation paradoxes imply that correlations between two variables can be different—or even completely in the reverse direction—at different levels of aggregation (Nieuwenhuis 2015). This implies that based on the existence of a negative association between women's employment and poverty at the micro level, it cannot be inferred that at the macro level growth in women's employment will be associated

with lower rates of poverty. There are (at least) three possible explanations for this phenomenon that bear relevance to this study.

First, it could be that growth of women's employment was among women who live in households that were not poor—even without their earnings. In that case, women's employment would indeed rise without having a direct impact on poverty rates. It has been meticulously documented how the observed increase in female labour market participation over the past decades in OECD countries has been a socially stratified process, with low-skilled women participating to a much smaller extent than the higher educated (Cantillon et al. 2001; Evertsson et al. 2009; Konietzka and Kreyenfeld 2010). Moreover, marital homogamy boosts a positive correlation between spouses' earnings (Blossfeld and Drobnič 2001), further exacerbating the labour market disadvantage and the welfare gap between low-skilled and high-skilled families. As a matter of fact, people living in workless or near-workless households are most at risk of poverty (OECD 2011). It has been hypothesized that such stratified increase in women's employment would go hand in hand with rising inequality between households (Esping-Andersen 2009). As such, an aggregation paradox would occur if the distribution of jobs exacerbates the gap between highly-educated dual earner households and low-skilled, low-work intensity households, pushing up median household income as a corollary (Marx et al. 2012).

Gregg and Wadsworth (2001, 2008) have shown that employment in a host of OECD countries has indeed become polarised into work-poor and work-rich households: while the share of households where everyone is in paid work has grown, the share of jobless households did not decrease. Corluy and Vandenbroucke (2014) found that in European countries most of the divergence between individual and household joblessness came from a skewed distribution of jobs. However, when linking polarisation to poverty outcomes during the brief period of 2004–2007, they stated that poverty trends in several European countries were only to a limited amount attributable to a failure to reduce joblessness. On the other hand, in his analysis of 15 EU countries and the United States, De Beer (2007) found that the simultaneous increase in employment and poverty rates in the majority of the countries in his sample could be explained by the fact that most of the additionally employed people belonged to work-rich households, in other words that “*many housewives with employed spouses had found jobs*” (p. 383).

The implication of this first explanation of the aggregation paradox is that to assess the impact of rising women's employment on poverty rates, we need a dyadic analysis that accounts for whether these women live with a partner in the household and whether this partner is employed or not.

The second explanation of the aggregation paradox could be that the growth of women's employment was among women who lived in poor households, but that the earnings from their employment were insufficient to lift the household above the poverty line. Work is not a guarantee for a poverty-free existence (Andreß and Lohmann 2008; Lohmann and Marx 2018). It has been well established that in-work poverty is a multifaceted phenomenon that is shaped by employment characteristics (annual working hours, hourly wages), composition of the household, and the institutional context (Crettaz 2013; Lohmann and Marx 2008, 2018). In particular women's employment has been cause for concern, as women are overrepresented in non-standard work arrangements such as temporary employment and part-time

employment. These jobs are associated with an hourly wage penalty and fewer working hours per week (OECD 2008). Such gender gap in wages and working hours could lead to in-work poverty, in particular in conjunction with care for dependent children, still overwhelmingly a women's affair in OECD countries (Uunk et al. 2005). The composition of the household is of major importance to fully understand this phenomenon. As women working in non-standard working arrangements are often secondary earners, even a small or lowly paid job might be sufficient to stay out of poverty (Horemans 2014). In the case of sole breadwinner of single parent households, however, even a well-remunerated job might not suffice for them to make ends meet (Immervoll 2007; Lohmann and Marx 2018; Maldonado and Nieuwenhuis 2015; Nieuwenhuis and Maldonado 2018).

The implication of this second explanation of the aggregation paradox is that we need to separate the impact of a woman being employed from the degree to which being employment protects against poverty and how this protective impact of employment has changed over time.

The third potential explanation of the aggregation paradox is that poverty outcomes are influenced by many factors, and that confounding factors may be causing an aggregation paradox to appear. For instance, the rise of women's earnings could have been at the same time, or even in response to, increasing precariousness and in-work poverty among men. It has been observed, furthermore, that minimum income protection schemes have become increasingly inadequate in providing income levels to sustain families with low work intensity above the poverty threshold (Nelson 2011; Marchal and Marx 2018). The overall tendency in the 1990s was one of almost uniform erosion of benefit levels relative to average wages in OECD countries (Van Mechelen and Marchal 2013). Although this downward trend came to a halt in a number of countries, net incomes of minimum income benefit recipients continue to fall short of the poverty line (Marx and Nelson 2013). As such, the impact of employment gains on poverty outcomes may be cancelled out by rising poverty rates amongst working-age jobless households, a phenomenon that has been observed in many developed welfare states. This implies that without these employment gains, poverty rates would have been higher still.

Because of these explanations of the aggregation paradox between women's employment growth and poverty, it is difficult to formulate "a priori" expectations on whether and in which direction rising women's employment rates will be related to poverty rates. There are, however, two bodies of literature that are informative in this respect. A large body of empirical work has been devoted to the question whether women's rising employment exacerbates or attenuates inequality among households. Running counter to what can be expected based on the skewed distribution of jobs over households, the literature consistently finds that rising women's employment and earnings had an attenuating effect on inequality among couple households (Gregory 2009; Lam 1997). This has been established in studies examining how inequality among households was affected by women's earnings in single countries (Mincer 1974; Björklund 1992), across countries at one point in time (Harkness 2013), and over time within various OECD countries (Nieuwenhuis et al. 2019). While this literature is limited to couple households and addresses inequality rather than relative poverty, it does provide a prior indication that increasing employment rates of women

narrows the income distribution. This potentially reduced the number of households living in poverty:

Employment Rate Hypothesis Poverty in OECD countries would have been higher and been rising faster since the 1970s, if women's employment rates had not been rising in that same period.

Not only did women's employment rates rise in OECD countries, so did the earnings among those women who were employed (Costa 2000). This was due to women (on average) starting to work more hours, working in better-paid occupations and positions, and the narrowing of the gender-wage gap (Blau and Kahn 2000; Charles 2011). This means that over time, the income from women's employment potentially became more important in protecting a household against poverty, particularly as the earnings of more women became sufficient to ensure that her household was not poor even if no other individuals in the household were involved in paid employment. This does not necessarily mean that increases in women's earnings resulted in a reduction of poverty, for instance if earnings increased among women in families who were not poor to begin with, or if these earnings improvements were not sufficient to protect some households against in-work poverty (Lohmann and Marx 2018). Overall, though, we expect that the net impact of the changing earnings among employed women was that their employment became more strongly negatively associated with poverty. In other words, their employment became more protective against poverty:

Employment Protection Hypothesis Poverty in OECD countries would have been higher and been rising faster since the 1970s, if the negative association between women's employment and poverty had not become stronger in the same period.

Data

It follows from the above that to test our hypotheses we require micro-level data on household-level poverty and on the employment status of household members, that are comparable across countries, and that for each country are available for several decades. We used data from the Luxembourg Income Study Database (Luxembourg Income Study (LIS) Database 2016), that harmonises existing survey data to a common template to optimize cross-national and over-time comparability (Nieuwenhuis et al. 2017).

We selected 15 OECD countries that were covered in the LIS Database for several decades. In each of these countries, we first calculated households' poverty risk, defined as having a disposable household income below 60% of the national median equivalised household income (Atkinson 2019; Atkinson et al. 2002). Household income was corrected for household size, using the modified OECD equivalence scale (OECD 2011) in which the first adult was weighted 1, additional adults were weighted 0.5, and children younger than 14 were weighted 0.3. We are interested in the poverty risk of households (rather than individuals), selecting a sub-sample of working-age households, defined as having at least one household member aged between 25 and 59. We included couples, single men, and single women (all with and without children), but for technical reasons we had to drop same-sex couples. We list-wise removed

Table 1 Descriptive statistics on countries, observed years, and number of observed households

Country	N. year	First year	Latest year	N. households
Australia	8	1981	2010	60,487
Canada	12	1981	2010	233,230
Denmark	7	1987	2010	293,253
Finland	7	1987	2010	55,494
France	7	1978	2010	55,998
Germany	11	1973	2010	147,407
Israel	8	1979	2010	30,792
Italy	11	1986	2010	58,536
Netherlands	8	1983	2010	38,297
Norway	8	1979	2010	332,605
Poland	7	1986	2010	138,512
Spain	8	1980	2010	66,432
Sweden	6	1981	2005	52,959
United Kingdom	10	1974	2010	105,319
United States	11	1974	2013	469,872
Total	129	1971	2013	2,129,193

Source: LIS Database

observations that had missing values on one or more of the variables described below. In total, this resulted in a sample of 2,129,193 observations, from 129 LIS datasets covering 15 countries over a timespan from 1971 to 2013. For each country, Table 1 shows the number of observations, the number of years the country was observed, and the total timespan covered.

The analyses were based on a limited number of 7 variables. The rationale for using only such a small number of variables is explained below. The variables were:

Poor Binary indicator of a household being at risk of poverty (AROP), defined as having an household income (equivalised for size using the modified OECD scale) below 60% of the national median equivalised household income. This median household income was based on all households in the data (not just based on our subsample).

Woman's Employment A binary indicator of whether the woman living in the household, if present, is currently employed or not. This is the independent variable of interest.

Man's Employment A binary indicator of whether the man living in the household, if present, is currently employed or not. This variable serves to control the effect of women's employment for the impact of men's employment (and therefore dual earnership).

Single woman A binary indicator of a household headed by a single woman. This control variable serves to account for an increasing number of women living as single.

Single man A binary indicator controlling for households headed by a single man.

In addition, two control variables are used:

Number of children This household-level variable represents the number of children under the age of 18 living in the household.

Highly educated This individual-level dummy variable indicates women and men having completed tertiary education completed (ISCED 2011 levels 5–8). Two dummy variables were used to indicate women's and men's education separately.

Method

The data were analysed using a decomposition technique originally developed by Evelyn Kitagawa (1955). This technique is better known as the Blinder–Oaxaca decomposition (Oaxaca 1973; Jann 2008; Sinning et al. 2008), and allows us to link trends in women's (micro-level) employment to (macro-level) trends in poverty. This decomposition compares the proportion of poor households in two different years to assess whether poverty rates have changed over time. Then, it decomposes the change in poverty into (a.) changes in the proportion of women who are employed (controlled for changes in average scores of other independent variables) and (b.) changes in the association between women's employment and the dependent variable poverty (again, controlled for the other independent variables). In other words, with respect to women's employment and poverty, the Kitagawa–Blinder–Oaxaca (KBO) technique can be used to decompose a change in poverty into (a.) changes in women's employment rates and (b.) changes in the degree to which individual women's employment protects their household against poverty.

The first step in the decomposition is estimating a regression model (with the same model specification) for each year separately. In our case, this model is straightforward, and purposively kept simple:

$$\begin{aligned} \text{logit}(P_{\text{poor}}) = & \alpha + \beta_1 \times \text{WomanEmployed} \\ & + \beta_2 \times \text{ManEmployed} \\ & + \beta_3 \times \text{SingleWoman} \\ & + \beta_4 \times \text{SingleMan} \end{aligned} \quad (1)$$

For the purpose of this paper, we will focus on the impact of a woman being employed (β_1) only, while controlling for the other variables. The second step of the decomposition is to decompose the change in poverty, for instance between 1975 and 1980:

$$\Delta_{\text{poverty}} = \overline{Poor}_{1975} - \overline{Poor}_{1980} \quad (2)$$

The trend in poverty (Δ_{poverty}) is decomposed into two components, referred to as the effects due to differences in *endowments* and to *coefficients* (in other applications of the same decomposition technique, these are sometimes referred to as the explained and unexplained parts, respectively). It should be noted that the decomposition presented below applies to linear regression models, whereas we apply it to logistic regression. The conceptual argument is the same, and the presented version is more concise. Since

the log-odds of households being poor can be expressed as a linear function of the parameters of Eq. 1, we could decompose changes in the mean of these log-odds using Eq. 2. However, we are not interested in this but in decomposing the change in the probability that a household is poor. As this probability is not a linear combination of the parameters of Eq. 1, we use Yun's (2004) generalisation of the decomposition that applies to non-linear models. At the end of the results section, we present sensitivity analyses based on the linear probability model (LPM).

The effect due to (differences in) endowments of women's employment is:

$$\text{Endowment} = (\overline{\text{WomanEmployed}}_{1975} - \overline{\text{WomanEmployed}}_{1980}) \times \beta_{1(1980)} \quad (3)$$

The effect due to (differences in) coefficients of women's employment is:

$$\text{Coefficient} = \overline{\text{WomanEmployed}}_{1975} \times (\beta_{1(1975)} - \beta_{1(1980)}) \quad (4)$$

The effect due to endowments represents how much of the change in poverty over time can be attributed to changes in the proportion of women who were employed, and is a function of the change in the average score on the women's employment variable (i.e. an increased number of employed women), multiplied by the coefficient of women's employment on household poverty risk. For the latter, we selected the most recent year. In the example above, the effects due to endowments can be expressed and interpreted as the number of percentage points poverty would have been higher (/lower) in 1980, if the average number of employed women had not changed since 1975. The effect due to coefficients represents how much of the change in poverty over time can be attributed to trends in how strongly women's employment was (negatively) associated with poverty, and is a function of the change in the coefficient of a woman's employment on household poverty risk between (in the example above) 1975 and 1980, multiplied by the (average) number of employed women in 1975. The interpretation of this effect due to coefficients is the number of percentage points poverty would have been higher (/lower) if there had been no change (from 1975 to 1980) in how well a woman's employment protects a household against poverty, for the number of women who were employed in 1975.

For each country, we will perform two sets of decompositions. The first compares each year to the previous year in which the same country was observed in the LIS database. This provides estimates of short term changes in women's employment and poverty, typically covering 3–5 years between LIS waves. The second set of decompositions will compare each observed year to the first year the country was observed in the LIS database. This provides estimates for the longer term trends. As we will present estimates for both sets of decompositions, and both for the effects due to endowments due to coefficients, we will limit ourselves to a graphical presentation of the results, and focus only on the impact of changes in women's employment.

Five final comments should be made before presenting the results. First, the goal of this paper is to assess the *total* association of trends in women's employment rates with trends in poverty, using micro-level data. This is the reason that we opted

for a simple statistical model. However, it should be noted that with the Kitagawa–Blinder–Oaxaca decomposition we still distinguish between changes in the number of employed women, and the degree to which women's employment protects against poverty. Trends in the latter can be caused by various factors, including women working longer hours, in better-earning occupations and positions, and gaining higher wages. While we do not go into such detailed explanations, the decomposition picks up on the impact of changes in how well women's earnings from employment protect their households against poverty on macro-level trends in poverty.

Secondly, unobserved variables that are determinants of women's employment are likely to affect both the effects due to endowments and coefficients. This is desirable, and reflects our goal as described above to estimate the total effect of changes in women's employment on trends in poverty. To the extent that the unobserved variables do not determine women's employment, but do affect (trends in) poverty, this is accounted for by the decomposition (by the difference between the intercepts of Eq. 1 as estimated for the two separate years). In addition, since we analyse trends within countries, all time-invariant (unobserved) heterogeneity between countries is accounted for as well, similar to commonly applied fixed-effects designs (Angrist and Pischke 2009).

Thirdly, when interpreting the effects due to endowments and coefficients, one should realise that these can be, to some extent, correlated. For instance, it was argued that decreasing levels of social protection and/or low wages have been the price for increasing employment rates (including those of women) (Iversen and Wren 1998). In our framework, this would result in the suppression of the effect due to changes in coefficients (in relation to the lower wages). So, to interpret the total impact of the rise of women's employment, one could interpret the sum of the effects due to endowments and coefficients.

Fourthly, in the graphical results that follow, a small number of outliers were removed from the data. These were likely caused by multicollinearity in the data, and none of these outliers were statistically significant (with very large standard errors).

Finally, in the description of our results we emphasise the effects related to differences in endowments. This was instigated by the primary motivation of study, which pertains to social policy goals of increasing the *number* of employed women to (help) reduce poverty.

Results

In this section, we present descriptive results as well as those of the Kitagawa–Blinder–Oaxaca (KBO) decomposition. As these analyses produce a substantial amount of output, we present the key results in the form of figures only (the supplementary material Table 3 presents the numerical estimates). Figure 2 presents, for 15 OECD countries, trends in three key indicators. First, Panel A shows trends in households at risk of poverty. It is evident from these results that poverty rates differ substantially between countries, being relatively high for instance in the United States and Israel, and typically lower in the Nordic countries such as Sweden, Denmark and Finland.

Trends in poverty were either absent or upwards, particularly in Israel and Italy over the whole period and in Spain, Sweden, and Finland in recent years.

Panel B shows observed trends in women's employment. These trends are upwards in nearly all countries. The Netherlands, Germany and Spain show marked increases, whereas trends are more moderate in for instance Poland, France and the United Kingdom. The Nordic countries are characterised by comparatively high rates of women's employment, but show barely any further increase in the period observed. Sweden and Finland even show a small decline. Upward trends followed by a plateau were found in the United States, the Netherlands, and Germany.

Panel C shows the association between women's employment and the poverty risk of their households. In all countries these estimated logits are negative, indicating that households were less likely to be poor when a woman was employed (controlled for being single or not, and the effect of her partner working or not). Typically, the logits became more strongly negative over time, suggesting that women's employment became more important in protecting a household against poverty. As theorised above, this could be the result of women working more hours, in higher status positions and for higher wages.

The three panels of Fig. 2 combined show the same macro-micro paradox discussed in the introduction (see Fig. 1), albeit with more detail: Despite marked increases in women's employment rates, and despite women's employment becoming increasingly protective against poverty, OECD countries displayed absent or upward trends in poverty. This again demonstrates the need to examine the macro-level association between trends in women's employment and trends in poverty using micro-level data.

To provide additional insight into the potential of women's employment growth to reduce poverty, Fig. 3 shows women's employment rate by the income decile of their households. This is done for the earliest and most recent waves in our data, by country (see Table 1). The dashed, vertical lines represent the poverty rates in the respective years (blue/light for earliest year, and black/dark for the most recent). This figure should be interpreted with caution, as in our cross-sectional data these are not the same households in each wave, and we do not know what the income decile of the household would have been without women's earnings. Yet, it is relevant to understand in what part of the (household) income distribution the rise of women's employment took place. For instance, in Australia we observe a poverty rate of approximately 15% in both years. The black line shows a higher employment rate for women in the most recent year, compared to the first year we observed Australia as represented by the blue line. Yet, most of this employment growth was among women living in households in higher income deciles, thus not affecting their poverty risks. A similar scenario is, for instance, seen in the United Kingdom and in the United States. In Canada we do observe (some) employment growth among the lower income deciles, and indeed a reduction in poverty risks. Nevertheless, the overall impression from Fig. 3 is that much of women's employment growth was situated among the higher income deciles.

Figure 4 shows the effects due to (changes in) endowments, based on the Blinder–Oaxaca decomposition. These effects indicate the extent to which trends in poverty were affected by increases in women's employment rates—net of the impact of changes in the degree to which employment and other determinants protect against poverty. The black lines present the short term, “year to year” effects due to endowments, rep-

Fig. 2 Trends in (a) poverty, (b) women's employment rate, and (c) micro-level association women's employment and poverty (logit)

Fig. 3 Women's Employment by Disposable Household Income Deciles, earliest and most recent wave. The dashed, vertical lines represent poverty rates (blue for earliest wave/year, and black for the most recent) (colour figure online)

representing the degree to which poverty would have been higher (/lower), if women's employment had not increased (/decreased) since the previously observed year. The blue trends present the long term, "cumulative" impact of changes in women's employment, representing how much poverty would have been different if women's employment had not changed since the first year in which a country was observed. Canada provides a clear case to illustrate the interpretation of these results. Between 1971 and 1975, women's employment rates rose from 40 to 46%. The effect due to

Fig. 4 Effects due to endowments: impact of trends in women's employment on trends on poverty

endowments was slightly positive, at +0.6. This means that if women's employment had not risen, poverty would have been 0.6 percentage points higher in Canada in 1975. Then, from 1975 to 1981, women's employment further rose to 61%. This had a short-term effect of +2.8% points. The long-term effects indicate that if women's employment had not risen since 1971, poverty in 1981 in Canada would have been 3.9% points higher: 21% instead of the observed 17%. After 1981 the increase in women's employment was much slower, which translated to small (and often statistically insignificant at the 5% level) year-to-year effects. Nevertheless, these small effects added up to a statistically significant long-term effects of 6.8% points in 2010. Following this example, we discuss three key findings regarding the effects due to endowments.

First, we found that in these 15 OECD countries, rising women's employment rates typically were associated with reductions in poverty. However, the short-term, year-to-year effects were found to be small and not always statistically significant. This suggests that while a woman who entered employment might have had an immediate impact on the economic well-being of her household, the process of rising women's employment rates having an impact on a country's poverty rate is typically a long-term process. Indeed, the results indicate that over time, the small effects accumulate to sometimes sizeable effects due to changes in endowments of up to 5.7% points in the Netherlands in 2010, 7.5% points in Spain in 2007, and 7.8% points in Israel in 2010.

Secondly, it was found that there was almost no effect due to endowments in the Nordic countries where women's employment rates were very high throughout the observation period. In Denmark, with women's employment rates being stable at around 80%, the long-term effect due to endowments from 1987 to 2010 was +0.3%

Fig. 5 Effects due to coefficients: impact of trends in poverty-protection (logit) of women's employment on trends on poverty

points. In Finland and Sweden, a slight decline in women's employment was observed, translating in a slight increase in poverty (long-term effects due to endowments of -1.6 and -1.4 respectively).

Finally, in countries that initially showed a marked increase in women's employment, this increase was typically followed by a levelling off in that trend, or even a plateau. This was clearly observed in the United States and Canada, but also in Spain and the Netherlands. Consequently, the short-term effects due to endowments became close to 0 as well. For instance, they were no longer (statistically significant) different from 0 in the Netherlands after 1999. In the United States it was observed how the short-term effects became increasingly close to 0, with the long-term effect levelling off after 1997 at a level of around 5% points.

In the methods section it was already explained that the effects due to (changes in) coefficients, displayed in Fig. 5, are more difficult to interpret. Nevertheless, it is worth pointing out that these effects are typically much smaller than those due to endowments. For instance, in the United States the logit of women's employment decreased from -1.3 in 1974 to -1.6 in 2010. The long-term effects indicate that had this change not occurred, poverty in 2010 would have been higher by 2% points. However, in many other countries, while the logits of women's employment on poverty risks consistently became more negative, the effects due to coefficients often failed to reach statistical significance.

With respect to our two hypotheses, we conclude that our findings corroborate the "employment rate hypothesis", while the "employment protection hypothesis" generally was not supported by our findings. We further examine the effects due to endowments. In Fig. 6, the association between changes in women's employment

Fig. 6 General association between change in women's employment and effects due to (year-to-year) changes in endowments

rates and the (short-term) effect of these changes on poverty are plotted. The data points of the different countries in our analyses were combined here. As would be expected, the line crosses the origin of the graph, representing that no change in women's employment aligns with no effect on poverty. Increases in women's employment were associated with a poverty reducing effect, although at each level of increase in women's employment a substantial amount of variability in the effects was observed. Declining women's employment rates were associated with negative effect on poverty, indicating an increase in poverty. Overall, these results suggest that poverty reduction of 1% point requires women's employment rates to rise with about 10% points. In the next section we will reflect on these findings and their policy implications.

Finally, in Table 2 we present several supplementary analyses. First (in columns labeled "(a) Women's and men's employment"), we compare how strongly poverty was associated with long-term developments women's employment and with long-term developments in men's employment. The column with women's effects due to endowments correspond to the cumulative effects shown in Fig. 4 (for the most recent year, thus covering the full observation period). The estimates for men represent the same cumulative effects, and were obtained from the same Kitagawa–Blinder–Oaxaca decompositions. Two things stand out. Whereas in most cases the effects due to endowments among women are positive, men's tend to be negative. In other words, had women's employment not been rising, poverty in recent years would have been higher. Had there been no changes in men's employment, poverty in recent years would have been lower. This represents the increased precariousness of men's employment. Secondly, the results in Table 2 suggest that in most countries the developments in

Table 2 Effects due to endowments of cumulative trends in employment on poverty (percentage points)

Country	(a) Women's and men's employment		(b) LPM		(c) Control Variables (LPM)		
	Women	Men	Women's employment		Women	High education	Child(ren)
Australia	2.60	- 1.37	3.30		1.91	1.21	0.76
Canada	6.79	- 1.71	8.06		7.28	4.07	2.52
Denmark	- 0.35	- 0.96	- 0.39		- 0.38	0.36	0.01
Finland	- 1.55	- 1.35	- 1.47		- 1.35	1.80	0.61
France	3.40	- 1.94	4.51		4.15	1.46	1.33
Germany	- 1.76	1.00	5.79		3.48	0.53	0.55
Israel	7.81	- 3.48	8.16		6.91	2.48	1.06
Italy	4.67	- 1.03	4.36		4.17	0.52	2.31
Netherlands	5.67	0.05	6.34		6.01	1.02	1.34
Norway	0.61	- 0.44	0.93		1.74	0.21	0.30
Poland	1.29	- 0.03	2.76		2.22	1.90	1.35
Spain	6.81	- 1.41	7.99		6.89	3.11	3.28
Sweden	- 1.41	- 1.42	- 1.44		- 1.81	0.20	0.04
United Kingdom	4.48	- 7.88	1.73		0.55	0.49	- 0.00
United States	4.00	- 1.43	4.85		4.18	4.19	1.37

Comparing (a) women's and men's employment, (b) logit and linear probability model (LPM), and (c) controls variables

Source: LIS Database

Note: In some countries, the control variables in columns c were not available for early years. Hence, these results encompass trends that start in 1985 (Australia), 1984 (Germany), 1986 (Norway), 1992 (Sweden), and 1999 (United Kingdom). The full time period (see Table 2) is covered in all other countries

women's employment have had a substantially large impact (in absolute terms) on poverty compared to changes in men's employment.

As a second supplementary analysis, in the column labeled "(b) LPM", we performed the same decomposition but on regression models that were estimated with the linear probability model. We present here the long-term effects due to endowments for women's employment. Only for Germany, the results are markedly different using the LPM compared to the decomposition based on the logit. In Fig. 3 we already saw that the long-term effects due to endowments could not be displayed for the full period, which was due to outliers. The result of the LPM is consistent with the observation in b of Fig. 2, suggesting that poverty would have been rising more had it not been for the clear rise of women's employment. For all other countries, although the effects due to endowments tend to be slightly higher using the linear probability model (LPM) compared to using logits (columns a), the results confirm that our overall conclusions were not sensitive to the choice of logits over LPM as estimation method.

As a third supplementary analysis, in the columns labeled "(c) Control Variables (LPM)", we present decompositions of the same linear probability models with two additional control variables. Although the purpose of this paper is to examine the total impact of trends in women's employment, it is relevant to consider how sensitive the results are to potential confounders. Hence, we control for education and the number of children in the household. Both the rise of women's education (Bussemakers et al. 2017) and the decline of fertility (Nieuwenhuis et al. 2012; Van der Lippe and Van Dijk 2002) have been found to be key determinants of women's employment. After these control variables are introduced to the model, the effects due to endowments of women's employment were somewhat smaller. Yet, the conclusions drawn above remain supported. In addition, the effects due to endowments associated with these controls suggest that had there not been a rise in the proportion of women with a high level of education, and a decline in the number of children in the household, poverty would have been (somewhat) higher.

Conclusion and Discussion

The surge in women's employment is undoubtedly one of the most important social changes that welfare states have experienced in the past four decennia. Its consequences reach far. First, it was a key driver of the increase of the work volume in labour markets over the past decades. Second, care labour that women had previously done unpaid got a high and direct price. Welfare states had to take up a significant part of care work. Third, 'new social risks' arose (Bonoli 2013) to which the traditional welfare state did not have an adequate answer: the work-life balance and the inadequacy of a single household income.

Not surprisingly then, women's changing roles had important implications for both the levels and distribution of household incomes. The post-industrial phase of economic growth was "*unambiguously associated with increasing female labor*" (Olivetti 2013, p. 6). After the first phase of welfare capitalism in which economic growth coincided with a reduction of women's employment (the industrial economy mainly needed male labour force supported by the good homely care of the housewife), the growth

of the new service and knowledge economy was supported by the growing group of educated women to an important degree. Hence, rising employment of women was an important factor in the increase of (median) household incomes, and consequently of growth of the Gross Domestic Product (GDP). Studies also consistently find that the rise of women's employment has had an attenuating effect on inequality among couples. Despite homogamy (that causes the accumulation of high or low incomes at the household level), women's earnings attenuate to a certain degree the unequal distribution of individual incomes. So, instead of women's earnings "*almost certainly increas[ing] inequalities*" (Esping-Andersen 2009, p. 59), women's earnings had an equalizing impact on what is now called '*pre-distribution*' (Hacker 2011; Atkinson 2015; Harkness 2013; Nieuwenhuis et al. 2019). This was again confirmed by our findings.

In this paper we showed that women's rising employment was associated with lower poverty defined as living with a household income below 60% of equivalized median income. Naturally, the results presented here cannot be considered a basis for causal inferences, as on the micro-level our data were cross-sectional. At the macro-level, time-invariant differences between countries did not affect our results. We highlight, however, several (unobserved) time-variant factors within countries that may have affected our results. The first pertains to the motivation of this study, which is the social investment perspective on social policy making, with greater emphasis on facilitating employment through public services and less emphasis on poverty reduction through redistributive benefits. To the extent that for instance investments in public childcare to facilitate women's employment have come at the expense of the levels of benefits for the unemployed, this could have resulted in elevated poverty risks for the unemployed that were not (directly) related to the rise of women's employment. However, there is little evidence for such shift in public expenditure (Vandenbroucke and Vleminckx 2011; Noël 2018). The second pertains to the aforementioned possibility that the rise of women's employment came at the cost of lower wages (Iversen and Wren 1998). To the extent to which this mechanism occurs, this may explain why we found that the effect due to changes in coefficients contributed little to explaining trends in poverty: if women's wages indeed decreased as their employment became more common, their earnings would indeed have become less effective in protecting their households against poverty. Finally, it could be that with the rise of women's employment patterns of family formation have changed with consequences for the polarisation between work-rich and work-poor households. The implications of this third (possible) trend are discussed below.

Making the distinction between how the rising number of employed women is related to trends in poverty on the one hand, and how well their employment protects against poverty on the other, proved highly insightful. Typically, since the mid 80s in the 15 OECD countries under review in this paper a 10% point increase in women's employment was associated with a poverty reduction of 1% point. The poverty standstill observed in many countries during the past decades can thus at least partially be explained by rising women labor market participation. Had women's employment not become more prevalent, poverty would have risen more; in some countries even substantially more.

Reducing poverty is important, but it should be acknowledged that the importance of fostering gender equality and women's employment reaches far beyond the instrumental purpose of reducing poverty. Women having an income of their own is directly linked to their current and future economic independence. Employment is not only a source of current income, but also an investment in future employability and the accumulation of rights in terms of social security and pensions (Lewis 1992). Moreover, it has been well documented that household income is not shared equally among couples, and that women having an income of their own is associated with more control over household income (Bennett 2013; Atkinson 2019), more influence on decision making within the household (Sen 1990), more gender-equal sharing of unpaid housework and childcare (Evertsson 2014), and positive child outcomes (Hansford 2016).

This is of course not to say that there were only winners. Along with increasing women's employment a striking polarisation of jobs over households took place. The share of the group of households that employs its full work potential (the so-called work-rich households) has increased significantly, while the share of work-poor families remained very stable. Both groups have a very different social profile: work-rich families are highly educated and often have two incomes. Work-poor families often are low-skilled, single-parent families and couples that did not succeed to access the post-industrial labour market. Previous research indicated that poverty among these work-poor households has risen consistently and has now reached extremely high levels (Cantillon and Vandenbroucke 2014). As a general rule, even though there are great differences across countries, the social protection for these households has become less adequate and less secure. However, in the general poverty statistics, the increasing precariousness of work-poor families has been neutralised by the increase in the share of two-income families. As such, the positive influence of women's rising labour market participation on relative income poverty is the result of compensating movements, with winners and losers.

In some countries the trend of women's rising employment seems to stagnate. In the Netherlands, Norway, and the United Kingdom upward trends came to a halt. The Nordic countries report very high levels of female employment, but with no further increase. Sweden and Finland even show a small decline, as did the United States in recent years. If such stagnation of women's employment rates continues, this poses a serious challenge for social policies that seek to reduce poverty by stimulating women's employment (Cantillon 2011). Even though rising women's employment rates have had a tangible impact on poverty in various countries, it took place over the course of several decades. Moreover, these reductions in poverty required an increase in women's employment that was so substantial that such an increase cannot be repeated given the limit that women's employment rates seem to have reached in most countries.

Of course, the focus of our study was on the *total* effect of rising women's employment on poverty, which means that (other than for changing family structure and education) we did not consider variables explaining women's employment, nor did we differentiate between the types of employment (and associated poverty) of women with different social backgrounds. This means that our findings point toward the limited potential for social policies to further reduce overall poverty rates by stimulating women's employment, but that this does not preclude facilitating employment to reduce poverty among specific socio-demographic groups. Rather than solely focus-

ing on increasing the number of employed women, the results presented here strongly suggest the importance of focusing on how the distribution of family income and poverty will evolve in the future. Social policy can operate in other ways than merely stimulating the *number* of employed women (Gornick and Smeeding 2018). Indeed, viable options seem to include, a priori, initiatives to increase the level and equal distribution of wages among those who are employed, to reduce in-work poverty (Lohmann and Marx 2018), to implement or expand in-work benefits (Marchal and Marx 2018), to reduce the gender pay gap (Mandel 2012; Evertsson et al. 2009; Goldin 2014), and to encourage a more equal use of public childcare (Van Lancker 2013).

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