The gender gap in economic dependency over the life cycle: some theoretical and practical considerations

Tanja Istenič, Irena Ograjenšek & Jože Sambt

Published online: 07 Feb 2018.

Submit your article to this journal

Article views: 304

View related articles

View Crossmark data

Routledge
Taylor & Francis Group

The gender gap in economic dependency over the life cycle: some theoretical and practical considerations

Tanja Istenič, Irena Ograjenšek and Jože Sambt

Faculty of Economics, University of Ljubljana, Ljubljana, Slovenia

ABSTRACT

Economic analysis usually defines the period of dependency with arbitrary age limits that are independent of country, year, gender and other factors. This paper uses the National Transfer Accounts methodology, which defines dependency by the life cycle periods in which individuals' consumption exceeds their labour income. The novelty of the paper is the decomposition of the results by gender, as well as the retrospective pre- and post-crisis analysis for the 2000–2012 period. Slovenia, an ageing European society with a small, open economy, is used as a showcase. The findings indicate that, in Slovenia in 2012, women were able to finance their consumption through their labour income for 29.0 years, compared to 35.9 years for men, with a significant decrease in the gender gap in economic dependency over time, from 7.9 years in 2000 to 6.9 in 2012. It would seem that the economic crisis interrupted the path to equal periods of economic dependency for both genders. However, overall, the gender gap tends to decrease, despite the economic crisis.

1. Introduction

During their lives, people go through two stages of economic dependency in which they consume more than they produce – the first one characterises their childhood and the second one their old age. The difference between an individual's consumption and his or her labour income is financed through public and private transfers or through 'asset-based reallocations', which occur through interaction with capital and financial markets. Between the two stages of economic dependency there is a middle stage of production surplus. That surplus of labour income is used for transfers to dependent generations or for the accumulation of wealth (Lee & Mason, 2011).

In order to understand how changes in population structure can affect the economy, its institutions and especially individuals, a new methodology called National Transfer Accounts (NTA) was developed. The NTA has created a new chapter in the System of National Accounts (SNA) by introducing age as a dimension. In this paper, we primarily focus on the NTA key category, life cycle deficit, which is calculated as the difference between

---

age-specific (private and public) consumption and labour income. The life cycle deficit enables us to measure and analyse individuals' economic dependency.

The life cycle deficit depends not only on age, but also on gender. Over the life cycle, a woman earns less, on average, than a man (Hammer, Prskawetz, & Freund, 2015; Pittau, Yitzhaki, & Zelli, 2015), but the difference in consumption between men and women is not pronounced (Kluge, 2014; Zannella, 2015). Women are, thus, economically dependent during a longer age span.

The gender difference (or gender gap) in economic dependency is driven by the gendered difference in labour income. Part of the difference between men's and women's labour income results from the so-called gender pay gap – the difference between average gross hourly earnings for men and women employed full-time. A large body of literature explains reasons for the existence of a gender pay gap. According to human capital models, women have traditionally participated in the labour market less continuously than men, which leads to decreased productivity and lower wages (Becker, 1985; Blau & Kahn, 1997, 2007; Mincer & Polachek, 1974). Additionally, women tend to choose less risky and (therefore) lower-paid occupations (Blau & Kahn, 2007; Organisation for Economic Co-operation & Development, [OECD], 2012) or face income discrimination in the labour market (Blau & Kahn, 2000, 2006; Castilla, 2008).

However, the gender pay gap has narrowed over time (Blau & Kahn, 2000, 2007; O'Neill & Polachek, 1993). On the basis of Mandel and Semyonov's (2014) empirical research, this narrowing is especially due to less frequent employment discrimination in the workplace. Further, centralised wage-setting institutions in Europe have been working to decrease differences in paid industry wages. Given the occupational gender segregation, this has also helped to decrease the gender pay gap (Kahn, 2014). Over time, men and women also have been choosing more similar fields of studies and occupations (England, 2010), which further decreases the gender pay gap.

An even larger portion of the gender difference in labour income can be explained by the traditional division of labour within the family, which leads to a lower labour force participation rate for women than for men. On average, women spend more time doing unpaid household work and devote less time to the paid labour market than men do (Altintas & Sullivan, 2016; Miranda, 2011). In addition, women's lower labour force participation rate can be explained by women's lower labour income. Thus, women are less motivated to enter the labour market or they leave it prematurely, which encourages couples to choose the traditional male breadwinner model (Zagheni, Zannella, Movsesyan, & Wagner, 2015).

However, the gender difference in the labour force participation rate is decreasing over time as well. According to Esping-Andersen (2009), the 'masculinisation' of women's economic life (measured by a smaller gap in the numbers of men and women earning college degrees, a higher employment rate for married women, and a higher employment rate for mothers with young children) leads to less gender specialisation in work within the family. Moreover, in the past few decades, the higher labour force participation rate for women has been promoted by more flexible job arrangements, such as temporary and part-time jobs (Zagheni et al., 2015).

The convergence in labour force participation rates has been accompanied by the convergence in gender-specific employment rates, since the gender difference in unemployment rates is declining over time as well. The gender employment gap further narrowed at the beginning of the current economic crisis (Addabbo, Bastos, Casaca, Duvvury, & Ni Léime,

2015; Cho & Newhouse, 2013; Jaba, Pârțachi, Chistrugă, & Balan, 2015). The sharpest narrowing of the difference occurred between 2008 and 2009, when the gender employment gap for the EU-28 countries fell from 15.0 to 13.4 percentage points (Eurostat, 2016b). This narrowing can be explained by a severe decline in the number of employees in sectors that predominantly employ male workers, such as manufacturing, construction and certain branches of the financial sector (Organisation for Economic Co-operation & Development, 2012; Perugini & Selezneva, 2015). Initially, the economic crisis also decreased the difference in earnings between men and women (Perugini & Selezneva, 2015), which also resulted from a drop in discretionary parts of pay packages (e.g., bonuses), which are typically more significant components of men's pay (European Commission, 2013).

Even though initially the financial crisis was seen as a crisis of male employment, the public indebtedness that the Eurozone faced from 2010 onward led to austerity measures that affected, to a greater extent, women's job prospects, since women represent a greater share of public sector employees (European Trade Union Institute, 2014; Rubery, 2015). Nevertheless, Corsi, Botti, and D'Ippoliti (2016) have shown empirically that, at the beginning of the crisis and through 2012, the gender gap in individuals' income decreased.

Previous economic crises had a relatively stronger negative effect on women's than on men's employment. Traditionally, women were (involuntarily) assigned the role of employment buffers in times of economic downturns (European Commission, 2013). However, in the past few decades, the evolution of the European labour market's structural and institutional features has greatly changed women's exposure to adverse shocks (European Commission, 2013; Perugini & Selezneva, 2015).

The promotion of gender equality has been an important item on the European Union's (EU) agenda (Rubery, 2015; Smith & Villa, 2010). Moreover, gender equality has become one of the fundamental EU rights (European Union Agency for Fundamental Rights, 2016). Economic independence is a pre-requisite for men and women to make their own decisions and, thus, control their lives (European Commission, 2016).

The NTA methodological framework enables us to introduce comprehensive and cross-country comparable measures of a gender gap in economic dependency. In this paper, we investigate the evolution of the gender differences in labour income, consumption and economic dependency (measured by life cycle deficit). Additionally, we examine the changes in the length and the size of the gender gap in economic dependency over time, focusing our analysis on the pre- and post-crisis period. Slovenia, an ageing European society with a small, open economy, is presented here as a showcase. Slovenia was highly affected by the economic crisis, which potentially disrupted the high degrees of gender equality that are promoted as part of the country's socialist heritage.

The main objective of our paper is to present some theoretical and practical considerations for measuring economic dependency. We start by presenting the standard measures of economic dependency and a recently developed NTA support ratio. The next section connects the life cycle theory with the concept of the life cycle deficit. In section 3, we discuss our use of NTA methodology to measure the gender gap in economic dependency. Section 4 is dedicated to the evolution of a gender gap in economic dependency over time; here, the novel approach of the NTA methodology is applied in the scientific literature for the first time. We conclude with policy implications of our findings.

2. Theoretical framework

2.1. Economic dependency

The effect of population ageing on sustainability of the public sector and reallocation of resources across age groups is commonly analysed by either the dependency ratio or the support ratio (Prskawetz & Sambt, 2014; Sanderson & Scherbov, 2015). The dependency ratio relates the dependent age groups (i.e., young and old people) to the working-age population. In contrast, the support ratio usually relates the working-age population to the dependent population. However, both indicators usually apply fixed age limits, where young people are defined as individuals younger than age 20 and old people are defined as age 65 and older. The working-age population includes individuals between these limits (from 20–64 years of age). When using fixed age limits, we cannot take into account changes in people's economic behaviours and dependency over time. Moreover, within those three main age groups, the level of economic dependency differs across age.

The support ratio indicator, as defined in Cutler, Poterba, Sheiner, Summers, and Akerlof (1990), was improved by relating age-specific labour force participation and wages with the consumption needs of young people, working-age adults, and old people (both labour income and consumption age patterns were multiplied by the age distribution of the population). However, only 5-year age groups are used.

Recently, the 'NTA support ratio' was introduced (Prskawetz & Sambt, 2014), which uses detailed (single-year) consumption and labour income age patterns, but also sub-categories. Using single-year age groups instead of broader (5-year) age groups makes it possible to precisely measure the gender differences in length and the size of economic dependency and to capture those changes over time. In our analysis, we follow the NTA approach, but we also introduce gender and time dimensions to account for the gender gap in economic dependency over the life cycle.

2.2. The life cycle theory and the life cycle deficit

According to Mincer (1958), individuals become more skilled and experienced over their working life and, consequently, their earnings increase. At older ages, their productivity then decreases, which often leads to lower earnings. However, the shape of labour income at young and old ages is even more determined by people's participation in the labour market. Decisions about the labour force participation of young adults, the elderly and women have a crucial effect on the shape of the labour income curve. Young adults have to decide between participating in the labour market or investing in human capital (i.e., prolonging their school attendance) (Lee & Ogawa, 2011). Older people in the developed world usually have an incentive to retire early, as a consequence of developed (generous) pension systems (Gruber & Wise, 2002), but also because of rigidities or age discrimination in the labour market (Lee & Ogawa, 2011; Rippon, Kneale, de Oliveira, Demakakos, & Steptoe, 2014). Additionally, a decreasing fertility rate means individuals are devoting less time to childbearing and child rearing, which has resulted in a higher labour force participation rate for women.

In addition to labour income, the consumption of an individual defines his or her economic life cycle. According to the life cycle hypothesis, people prefer stable consumption across their lifetime. During the working period, people's income exceeds their consumption. Thus, in the working period, people save money. In contrast, in people's early lives

and in old age, their consumption exceeds their income. To achieve the desired level of consumption, people receive transfers from other people or they need to spend savings or borrow assets (Ando & Modigliani, 1963; Lüth, 2001; Samuelson & Nordhaus, 2002).

The central concept of the NTA methodology – the life cycle deficit – is close to the concept of the life cycle theory. The life cycle deficit shows the difference between age-specific consumption and age-specific labour income. However, an important difference exists between the life cycle hypotheses and the NTA methodology. While the life cycle hypothesis can be explored only longitudinally, the NTA results represent a cross-sectional snapshot of a certain period of time (i.e., survey year).

3. Research framework

3.1. Main concepts and NTA methodology

Calculations of consumption, labour income and life cycle deficit at each age follow the NTA methodology as presented in Lee and Mason (2011) and in the United Nations (2013) manual. The NTA methodology stands on the following accounting identity:

$$\underbrace{C(x) - YL(x)}_{Life\ cycle\ deficit} = \underbrace{\tau^+(x) - \tau^-(x)}_{Net\ transfers} + \underbrace{YA(x) - S(x)}_{Asset-based\ reallocations} \tag{1}$$

An individual faces a life cycle deficit that comprises the difference between private and public consumption (C) and labour income (YL) at each age (x). The life cycle deficit is positive for the young and for the elderly, who consume more than they earn. The deficit can be financed through inter-generational flows in the form of net private and public transfers and private and public asset-based reallocations. Net transfers are the difference between transfer inflows (τ^+) and transfer outflows (τ^-), whereas asset-based reallocations represent the difference between asset income (YA) and savings (S). The accounting identity holds for each individual, all age groups and the national economy as a whole.

In this paper, we focus on the key NTA concept of life cycle deficit. However, we go beyond the standard NTA by introducing the gender dimension and the evolution of the life cycle deficit over time. To analyse economic dependency (measured in terms of life cycle deficit), we first need to estimate an extensive set of age profiles. The age profiles are calculated as age-specific averages for different categories that compound consumption and labour income using survey and/or administrative data. They are then further adjusted such that the sum of age-specific averages multiplied by the population by age matches the aggregate values calculated from the SNA. In most of the age profiles, we apply Friedman's supersmoother to eliminate the random factor (Luedicke, 2015). However, we did not smooth the age profiles by education, since the breaks in age profiles may reflect actual breaks because of entering or completing a certain level of education.

3.2. Main concepts and their operationalisation

3.2.1. Labour income

Labour income includes earnings and self-employment labour income. Earnings include wages and/or salaries and the employer's social contributions, domestic and those from the rest of the world. Self-employment income is not available directly; the SNA includes

only information on mixed income, which includes both return on labour (i.e., self-employment income) and return on capital of household enterprises. According to empirical evidence (e.g., Gollin, 2002), the NTA uses a simple assumption of allocating two-thirds of mixed income to labour income and one-third to the capital income. We calculate the labour income age profile for ages between 0 and 90+ as the sum of separately estimated age profiles of earnings (including the employer's social contributions) and self-employment labour income.[1] Both sub-categories of labour income are calculated as a weighted average of income components reported in the survey data.

The main micro-level data source we used in our calculations is the Slovenian Household Expenditure Survey (HES) for the years 2000, 2003, 2005, 2008, 2010 and 2012. In the HES, the income data are mostly available at individual level, whereas household expenditures are available at the household level. For the above-mentioned years, there are 3806, 3794, 3829, 3671, 3924 and 3663 households and 12,372, 11,688, 11,580, 10,992, 11,515 and 10,805 individuals, respectively, included in the survey.

3.2.2. Private consumption

We estimate private consumption/expenditures on (1) education, (2) health and (3) consumption other than education and health. Education and health are analysed separately from other aspects of private consumption as they show strong age patterns. Aggregate controls for private consumption include expenditures of corporations, households and non-profit institutions serving households. Calculating labour income age profiles is quite straightforward, whereas expenditures collected only at the household level make estimation of private consumption age profiles more difficult. We have to introduce rules to allocate total household consumption to each household member.

We estimate the age profiles of private education and health consumption using a linear regression model without a constant term. We allocate private health consumption to each household member by regressing household expenditures on the number of individuals of each age group in the household. The same procedure is used for allocating private education consumption, but, for this, we limit beneficiaries to enrolled pupils from age 0–30. The regression coefficients tell us how much household expenditures increase, on average, for an additional household member of a certain age. We then go back to the microdata to allocate total household expenditures to individual household members using the relative size of regression coefficients for their age group. In order to not lose too many degrees of freedom, in the case of private health consumption, we create 5-year rather than 1-year age groups before applying the regression procedure.

'Other private consumption' includes all other consumption except education and health (e.g., food, clothes, rent). It is allocated among household members using the ad hoc allocation rule based on Deaton's (1997) modified equivalence scale. The consumption share of children between ages 4 and 20 linearly increases from 0.4 to 1.0 times the consumption of an adult. The consumption share of those younger than 4 is assumed to be 0.4 times the consumption of an adult. Unfortunately, the HES includes imputed rents (which present a non-negligible part of other private consumption) only for the year 2012. For estimating housing consumption ('owner-occupied housing') we, therefore, need to use another micro-source data – EU Statistics on Income and Living Conditions (EU-SILC).[2]

3.2.3. Public consumption

Public consumption includes expenditures of the general government and, as for private consumption, these are again grouped into the following three categories: (1) education, (2) health and (3) consumption other than education and health. For age profiles of public consumption, we use administrative data, since surveys do not contain these data. To allocate public expenditures on education by age, we split final public consumption on education between different levels of education. Within each level of education, we use age- and level-specific enrolment rates to calculate relative per capita expenditures. We assume that, within each level of education, the expenditures per enrolled student are the same, regardless of the student's age.

In order to estimate the age profile of public health consumption, we use internal data from the Ageing Working Group (AWG) on the long-term projections of public expenditures. The data includes per capita public healthcare expenditures by 1-year age groups.[3]

Most of the 'other public consumption' category consists of collective consumption, such as government expenditures on defence, repairing public roads and lighting. We assume that all individuals are beneficiaries of collective consumption and, therefore, we apply uniform per capita distribution. Finally, we estimate the age profile of the life cycle deficit as the difference between age profiles of total consumption and total labour income.

3.3. The gender-specific NTA

We calculate the gender-specific NTA using the standard NTA approach described above, along with the Donehower (2014) guidelines. When age profiles are estimated from the survey data, the only difference in the estimation is that we calculate age- and gender-specific means, instead of only age-specific means. When applying the regression model, the gender dimension should be taken into account. We add separate regressors (number of persons in each age group) for men and women. In order to not lose too many degrees of freedom, we use 2-year age groups for estimating private consumption on education. When estimating the age profile of 'other private consumption', the same equivalence scale is used for men and women. Even though the obtained age profiles are not exactly the same for both genders, they reflect the difference in age and gender decomposition of households.

Public consumption on education is estimated using age-, level- and gender-specific enrolment rates. Again we assume the same public expenditures per enrolled at a certain level of education. The age profiles of public health expenditures, from the AWG, are age- and gender-specific.

Finally, we adjust the gender-specific age profiles to achieve consistency with the aggregate controls and the standard (unisex) NTA estimates. This means that the sum of the gender-specific per capita age profile multiplied by the gender-specific population is equal to the per capita age profile for both genders combined, multiplied by the total population of that age.

3.4. Measuring the gender gap in economic dependency

Following Hammer et al. (2015), we estimate the magnitude of economic dependency by relating the aggregate age-specific life cycle deficit of the dependent population (*LCD*) with the aggregate age-specific labour income of the total population (*YL*). Using the aggregate

values (calculated as the age-specific averages multiplied by the population by age) rather than per capita values helps us to capture the age structure of the population. Such a measure of economic dependency is called the NTA dependency ratio (*NtaDR*), presented in Loichinger, Hammer, Prskawetz, Freiberger, and Sambt (2017):

$$NtaDR = \frac{\sum_{x=0}^{x=L} (C_x - YL_x) + \sum_{x=O}^{x=90+} (C_x - YL_x)}{\sum_{x=0}^{x=90+} (YL_x)} = \frac{LCD}{YL} \qquad (2)$$

where index *L* denotes the highest age at which the *LCD* at young ages is still positive and *O* denotes the age at which the *LCD* at old ages is positive again; C_x and YL_x are the aggregate age-specific consumption and labour income.

Next, the gender gap in the magnitude of economic dependency is measured as the absolute difference in the NTA dependency ratios for both genders. We refer to this as the NTA dependency ratio gender gap ($\Delta NtaDR_{F/M}$), which is calculated in the following way:

$$\Delta NtaDR_{F/M} = NtaDR_F - NtaDR_M = \frac{LCD_F}{YL} - \frac{LCD_M}{YL} = \frac{(LCD_F - LCD_M)}{YL} \qquad (3)$$

where LCD_F and LCD_M represent the aggregate positive life cycle deficits for women and men, respectively. The indicator shows the additional share of total labour income needed to finance women's economic dependency as compared to the total labour income needed to finance men's economic dependency. To eliminate effects of the changing age and gender structure of the population over time, we use the European standard population (Eurostat, 2013).

Economic dependency can be additionally measured by the length of the positive life cycle deficit or the period during which the individual's consumption exceeds his or her labour income. To avoid the introduction of life expectancy indicator, we measure a higher dependency of women through their shorter period of economic independence. In particular, we subtract the age span of the negative life cycle deficit (i.e., life cycle surplus) for women from the one for men. Thus, the gender gap in the length of economic independence ($\Delta LCS_{M/F}$) is then as follows:

$$\Delta LCS_{M/F} = LCS_M - LCS_F \qquad (4)$$

The indicator shows by how many years women's economic independence age span falls short of men's economic independence age span. In order to get precise estimates of the indicator, we go beyond the standard NTA by estimating the length of the life cycle surplus using decimal numbers rather than only integers.

4. The gender gap in economic dependency over the life cycle: the showcase of Slovenia

4.1. Historical component in past NTA estimations vs our approach

Until now, only a few countries have included a historical component in the NTA estimation: the United States (Lee & Mason, 2011), Austria (Hammer, 2014) and France (d'Albis

et al., 2015). None of them estimated historical differences in labour income, consumption and life cycle deficit between genders. Furthermore, recent Slovenian data also allows us to analyse the effect of economic crisis on the gender gap in economic dependency.

4.2. Sociodemographic characteristics of Slovenia

With economic development, the periods of economic dependency have been gradually prolonged. In Slovenia, this process is even more pronounced. Among the EU countries included in the NTA project, Slovenia has the shortest age span of economic independence (Prskawetz & Sambt, 2014). Even though gender equality was traditionally promoted as a heritage from socialism, the EU gender equality policies have probably helped encourage more equal economic independence for both genders.

In Slovenia, the school life expectancy (i.e., how many years of education a child of school-entering age would receive during the lifetime at a given school enrolment rate) shows that Slovenian youngsters are staying in school longer than those in other countries. In 2012, school life expectancy in Slovenia was 16.84 years, whereas the average for Central and Eastern European countries was 14.75 years. In the period between 2000 and 2012, the school life expectancy in Slovenia lengthened by 2.09 years (United Nations Educational, Scientific & Cultural Organization, 2015). Young people in Slovenia, thus, tend to extend their period of formal education. As a consequence, they remain economically dependent for a longer time. However, young women tend to stay in school for a longer period than young men. In 2012, the enrolment rate in tertiary education for ages 19–24 was 40.3% for male students and 58.7% for female students (Eurostat, 2014b, 2015b).

Even though between 2000 and 2012 the participation rate in tertiary education increased by almost 50% for both genders (Eurostat, 2014b, 2015b), the labour force participation rate for ages 20–64 has expanded; however, it has done so more profoundly for women than for men. While women's labour force participation rate for ages 20–64 has increased from 68.3% in 2000 to 71.3% in 2012, the participation rate for men has increased from 78.1% to 78.8% (Eurostat, 2016d).

Furthermore, the elderly usually do not work as long as they physically can. Slovenia is characterised as a country with a very low employment rate in the age group of 55–64. In 2012, the figure was 32.9% compared to the EU-28 average of 51.8% (Eurostat, 2016a). Additionally, the employment rate of older workers in Slovenia is increasing to a smaller extent than in other EU countries. Even though pension reform occurred in 2012, the employment rate of Slovenian workers aged 55–64 increased from 29.0% in 2004 to only 35.4% in 2014, whereas in the EU-28 countries the employment rate increased from 40.6% to 51.8% for this age group (Eurostat, 2016a).

Also in Slovenia, the gender employment gap among working-age adults (a difference between employment rates of men and women aged 20–64) shrank from 10.0 percentage points in 2004 to 7.2 in 2012. However, the gender employment gap started to increase slowly in 2012 as a consequence of the economic crisis (Eurostat, 2016b).

4.3. Evolution of the gender gap in economic dependency in Slovenia in the period 2000–2012

4.3.1. Labour income

Figure 1 presents the evolution of labour income for men and women in the period 2000–2012. Even though we also estimated age profiles for the years 2003, 2005 and 2010, for clarity we only present here results for the years 2000, 2008 and 2012.

To make per capita age profiles comparable over time, we normalise them. We use a denominator commonly used in the NTA, average labour income of individuals aged 30–49. We normalise the age profiles to eliminate differences in the levels of income, exchange rates, inflation and the effect of the population age distribution over time. We chose the age group 30–49 as a stable denominator, since decisions in this age group are not much influenced by decisions about educational period, labour market entry or retirement decisions. In this way, we do not eliminate the gender differences in employment decisions, gender wage gap and so on.

The age profile of labour income is a typical inverted U-shaped curve. Individuals start to enter the labour market at age 15 – women later than men, because of their much higher enrolment rates in tertiary education. After completing their education, women's labour income is still lower than men's because of lower labour market participation rates. Additionally, wages of employed women are slightly lower than those of employed men. For example, in 2012, the gender pay gap was 2.6% (Eurostat, 2016c). The labour income age profile peaks in the 40s for both genders. It then starts to decrease because of lower participation rates for both genders, but this occurs earlier for women than for men because of earlier retirement. The average age at which women retire (old-age retirement) in 2012 was 58, whereas for men it was 61 (Pension & Disability Insurance Institute of Slovenia, 2016).
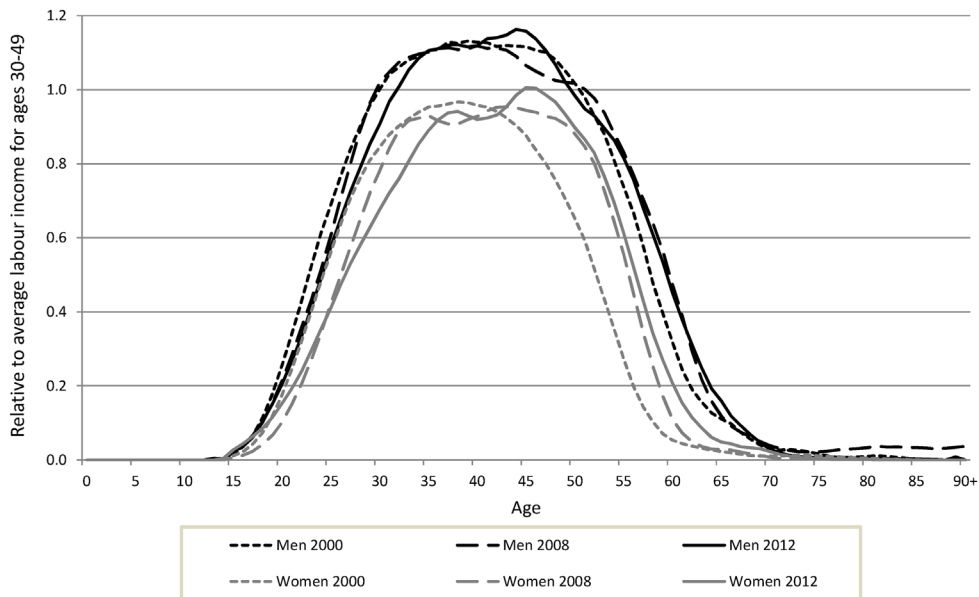

Figure 1. The evolution of labour income for men and women, 2000–2012. Source: Eurostat (2014a); Statistical Office of the Republic of Slovenia (2014); own calculations.

Over the years, the age profiles of labour income for men and women shift to the right, meaning that the young start to enter the labour force later and the elderly leave the labour force later. The later entrance of the young generations can be explained by the prolonged educational period, but also by the generous benefits that Slovenian students receive (Sambt & Malačič, 2011). During the economic crisis, the shift can also be explained by the flexibility of the student labour market; unlike other forms of work in Slovenia, student work can be easily terminated.

Even though the age profile of labour income shifts to the right for both genders, the shift is more pronounced for women than for men. Figure 1 shows the noticeable gender gap in the late working period in 2000, while the difference in the labour income for young men and women was less pronounced. Over time, the gender gap in labour income for older people narrows, but it becomes bigger for young adults.

4.3.2. Consumption

Figure 2 reveals the evolution of total consumption for the 2000–2012 period. At young ages the increase of total consumption (always expressed relative to average labour income for ages 30–49) is mainly driven by public consumption on education. Thus, we can observe an increase in investment in human capital over time. Public expenditures on education increase over time for all levels of education and that increase is especially pronounced in tertiary education.

In the entire period, the gender gap in total consumption starts to increase around age 20. Women spend more than men during the entire prime age period, although the gender gap is most noticeable during the childbearing period as a result of increased public and private health consumption. Figure 2 shows that the gender gap during motherhood increases over time.
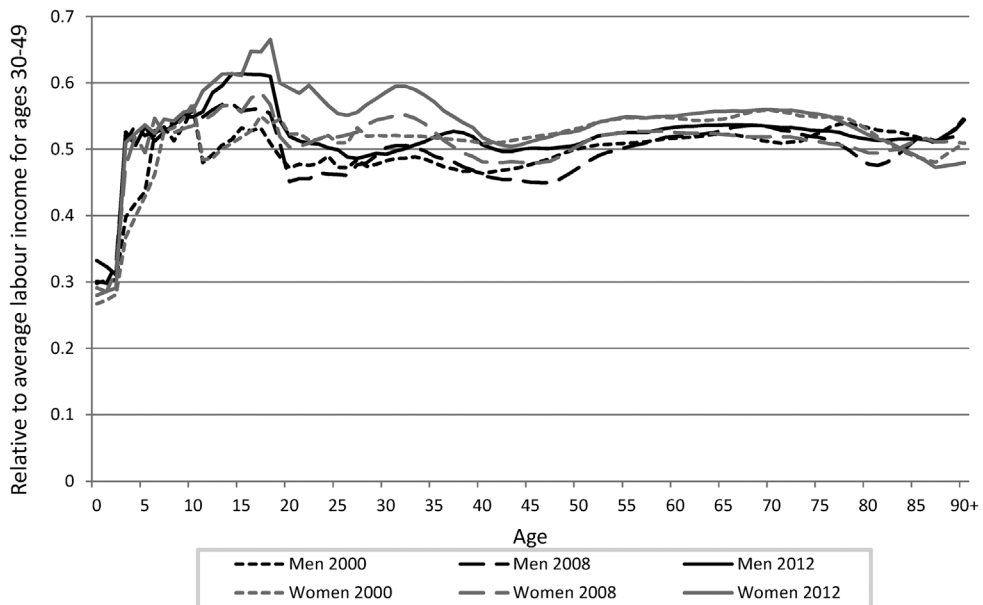

Figure 2. The evolution of consumption for men and women, 2000–2012. Source: European Commission (2012); Eurostat (2014a, 2015a); Statistical Office of the Republic of Slovenia (2014); own calculations.

With the exception of a hump in the early ages for both genders and women's increase in consumption during the young adult ages, total consumption is rather smooth across ages in the 2000–2012 period. This can be explained by the offsetting effect of private and public consumption as a consequence of high government involvement in the economic system (Sambt & Malačič, 2011).

Total consumption as a share of labour income increases over time. Therefore, in the next section we present how increased consumption relative to total labour income and changes in the relative age profiles affect the shape and the length of the life cycle deficit or surplus.

4.3.3. Life cycle deficit and the evolution of economic dependency over time

In Figure 3 we present the evolution of the life cycle deficit (LCD) relative to the average labour income for ages 30–49 in the period 2000–2012. The LCD increases until the young adult ages. Then it starts to fall as a result of increasing labour income and becomes negative during the 20s, when labour income increases above consumption. During their prime ages, individuals face the life cycle surplus (LCS). As a result of lower labour income, but higher consumption, the period of economic independence for women is not only shorter than that for men, but also less intense at all ages. The LCS turns into the LCD during one's 50s. Thereafter, the LCD rises until the majority of older workers retire. After that, it stabilises. The short period of the LCS (i.e., economic independence) is characteristic of all analysed years.

Over time, the age profile of the LCD shifts to the right, that is, toward higher ages. Due to a prolonged educational period, labour income starts to exceed consumption later in life. On the other hand, people are able to finance their consumption with their own labour income into older ages and, therefore, they become dependent again later in their life than previously. The main reason is later retirement due to pension legislation, which tightens
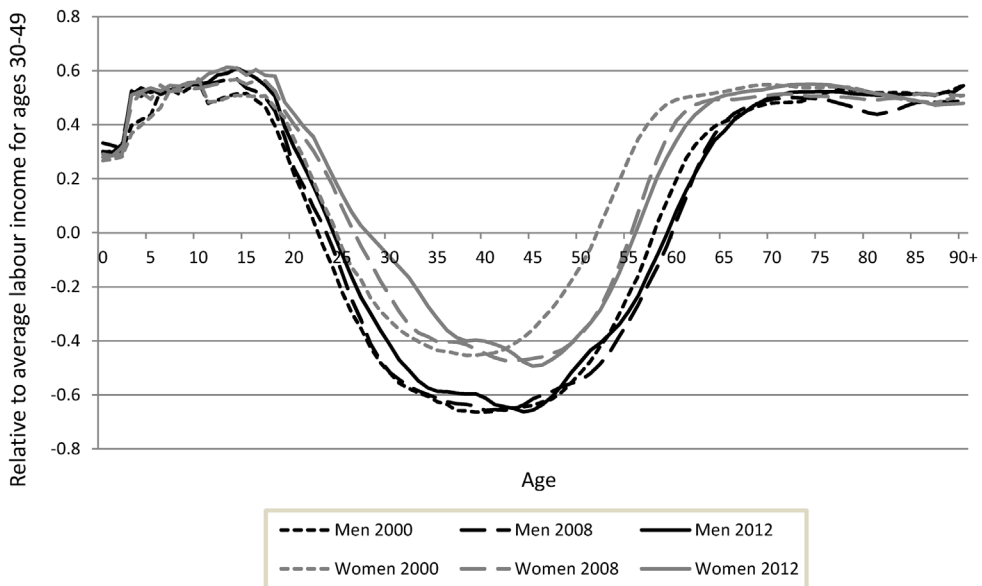

Figure 3. The evolution of life cycle deficit for men and women, 2000–2012. Source: European Commission (2012); Eurostat (2014a, 2015a); Statistical Office of the Republic of Slovenia (2014); own calculations.

retirement conditions (more for women than for men); therefore, the shift in the LCD age profile for women is more pronounced than for men.

In 2000, women were dependent until the age of 24.4 and after the age of 52.7. Men stayed dependent for a shorter age span, until the age of 22.5 and after the age of 58.6. Therefore, women were able to finance consumption with their labour income only for 28.3 years, whereas men could do so for 36.1 years. While the length of the LCS does not change much over time, there is a much more noticeable difference in the age limits of economic dependency. By 2012, the individuals tended to be economically dependent into higher ages (women until the age of 27.7 and men until the age of 24.1). At the same time, they were able to finance their consumption into higher ages (women until the age of 56.7 and men until the age of 60.0).

During 2000–2012, the gender gap in the length of economic independence decreased. The LCS for men slightly shrank from 36.1 to 35.9 years, whereas the LCS for women increased from 28.3 to 29.0 years. The gender gap in the length of economic independence, thus, shrank from 7.9 years in 2000 to 6.9 years in 2012.

Table 1 shows that pre-crisis, between 2000 and 2008, the length of the LCS increased for both genders. The increase was more pronounced for women than for men; therefore, the gender gap narrowed noticeably. At the beginning of the crisis, the LCS shortened more for men than for women. This was the result of a decline in the gender employment gap at the beginning of the crisis. The economic crisis first affected the industries with a predominantly male workforce; thereafter, the unemployment rate started to increase more intensively for women as well (Eurostat, 2016e). While the length of men's LCS increased in 2012, women's economic dependency was additionally prolonged between 2010 and 2012. Therefore, between 2010 and 2012 the gender gap in economic independency started to increase. Nevertheless, during 2008 and 2012, the gender gap in the length of economic independence decreased.

The NTA provides us not only with estimates of the length of economic (in)dependence, but also with estimates of its size. Men's positive LCD in 2000 accounted for 25.3% of total labour income and women's positive LCD for 31.6% of total labour income. Over time, the size of the gender gap in economic dependency has decreased. In 2012, the LCD relative

Table 1. The gender gap in the length and magnitude of the life cycle surplus and deficit for men and women, 2000–2012.

Year	Gender	LCD age borders (positive until/after)		Length of negative LCD (i.e., LCS)	NTA dependency ratio (NtaDR) (in %)	$\Delta LCS_{M/F}$	$\Delta NtaDR_{F/M}$ (in %)
2000	Men	22.5	58.6	36.1	25.3	7.9	6.3
	Women	24.4	52.7	28.3	31.6		
2003	Men	23.3	59.7	36.4	25.8	7.8	6.2
	Women	25.4	54.0	28.6	32.1		
2005	Men	23.5	59.9	36.4	24.7	7.1	5.7
	Women	25.4	54.7	29.3	30.4		
2008	Men	23.4	60.5	37.1	24.3	7.2	5.2
	Women	26.3	56.3	30.0	29.5		
2010	Men	23.9	59.6	35.7	27.1	6.3	5.4
	Women	26.7	56.2	29.4	32.5		
2012	Men	24.1	60.0	35.9	25.5	6.9	4.7
	Women	27.7	56.7	29.0	30.2		

Source: European Commission (2012); Eurostat (2013, 2014a, 2015a); Statistical Office of the Republic of Slovenia (2014); own calculations.

to labour income reached 25.5% for men and 30.2% for women. The gender gap in the size of economic dependency, thus, shrank from 6.3% in 2000 to 4.7% in 2012. Similarly to the length, also the size of economic dependency decreased significantly before the crisis, but it increased sharply at the beginning of the crisis for both genders. In contrast to the gender gap in the length of economic independence, the gender gap in the size of economic dependency increased at the beginning of the crisis, but shrank in the aftermath of the crisis. From its start and up to the end of 2012, the economic crisis indeed disrupted the path toward a smaller gender gap in economic dependency. However, overall, the economic crisis reduced the gender gap in economic dependency.

5. Discussion and conclusions

The age limits of (economic) dependency are usually set arbitrarily and independently, without regard to gender, country, year and so on. In this paper, we present a novel approach to study the evolution of gender differences in economic dependency over time, taking into account the actual age limits of economic dependency.

Using the NTA methodology, we estimate averages of labour income and consumption for each age over the life cycle, using Slovenia as a showcase. Combining those age patterns (i.e., age profiles) of consumption and labour income, we define the age limits up to and after which individuals consume more than they earn through labour. In the NTA framework, the difference between (public and private) consumption and labour income is referred to as the life cycle deficit. During the period of positive life cycle deficit, individuals depend on economic flows in a form of net transfers (difference between transfer inflows and outflows) and asset-based reallocations (difference between asset income and savings). In this paper, we have gone beyond the standard NTA by introducing gender and time dimensions.

We calculate the gender-specific labour income, consumption and life cycle deficit in Slovenia over the period 2000–2012. While the difference in labour income between genders is constantly present over the life cycle, the gender gap in consumption is negligible at all ages except the childbearing period, when women consume significantly more for both public and private consumption. It follows that lower labour income over the entire working period and higher consumption during the childbearing period cause a significant gender gap in the length of the negative life cycle deficit (i.e., life cycle surplus). While in 2012 men were able to finance their consumption with their own labour income for 35.9 years, women's life cycle surplus lasted only for 29.0 years.

Over time, the age profile of labour income shifts to the right (into higher ages) because of prolonged educational period and increased retirement age. However, this shift is more pronounced for women than for men. Moreover, during the 2000–2012 period, consumption relative to the average labour income increased for both genders. Additionally, the age profile of the life cycle deficit shifts to the right mainly as a result of the movement of the labour income age profile over time. During the 2000–2012 period, the length of the life cycle surplus for women increased by 0.7 years, while for men it slightly decreased. Therefore, the gender gap in the length of economic independence decreased.

Before the crisis, the age span of the life cycle surplus increased for both genders, but more sharply for women. Thereafter, the life cycle surplus decreased. At the beginning of the crisis, the shrinkage was more pronounced for men than for women. In the aftermath of the crisis, men's economic independence started to increase again, while for women it still

decreased. The crisis also importantly affected the size of economic dependency for both genders. The gender gap in the size of economic dependency increased at the beginning of the crisis, but started to decrease in the aftermath of the crisis. However, the gender gap in economic dependency shrank in the analysed crisis period.

Our results indicate that the proposed two indicators of the length and the size of the gender gap are relevant for policy-makers in striving for gender equity. The analysis shows that the crisis interrupted the path toward equal economic dependency for both genders. Therefore, the gender dimension should be considered not only in times of economic prosperity, but also continuously. Nevertheless, it seems that, in total, the gender gap continued to decrease during the crisis period.

An important characteristic of our study is its focus on the market economy only (unpaid household work is not included). Past studies have shown that women in all countries provide (much) more unpaid household work than men. Time use data for Slovenia (from which unpaid work is calculated and transformed into monetary units) is available only for the year 2000. Therefore, it is not possible to analyse the gender gap, including unpaid household work, over time. Policy measures should, therefore, not seek to eliminate the gender gap in the market economy without taking into account the gender gap in the provision of unpaid household work. Thus, accounting for unpaid household work in the measure of the gender gap in economic dependency remains a challenge for future research. Moreover, future availability of a comparable European NTA dataset will enable cross-country comparisons of the gender gap in economic dependency. Such results will probably create new avenues for future research, relevant for both academics and policy-makers.

Notes

1. The upper limit of 90+ is assumed to reduce the random effect of the negligible number of respondents of those ages.
2. The EU-SILC data is available only from 2004, and the data on imputed rents (for Slovenia) are available only from 2007. Therefore, for the years 2000, 2003 and 2005, we use the relative age profile of housing consumption from 2008, adjusted to the actual aggregate controls.
3. In all the years we use the same age profile along with the proper adjustment factor.

Acknowledgements

Disclosure statement

Funding

References

Addabbo, T., Bastos, A., Casaca, S. F., Duvvury, N., & Ni Léime, Á. (2015). Gender and labour in times of austerity: Ireland, Italy and Portugal in comparative perspective. *International Labour Review, 154*(4), 449–473. doi:10.1111/j.1564913X.2015.00250.x

Altintas, E., & Sullivan, O. (2016). Fifty years of change updated: Cross-national gender convergence in housework. *Demographic Research, 35*, 455–470. doi:10.4054/DemRes. 2016.35.16

Ando, A., & Modigliani, F. (1963). The "life cycle" hypothesis of saving: Aggregate implications and tests. *American Economic Review, 53*(1), 55–84. doi:10.2307/1817129

Becker, G. S. (1985). Human capital, effort, and the sexual division of labor. *Journal of Labor Economics, 3*(1), 33–58. Retrieved from: http://www.jstor.org/stable/2534997

Blau, F. D., & Kahn, L. M. (1997). Swimming upstream: Trends in the gender wage differential in the 1980s. *Journal of Labor Economics, 15*(1), 1–42. Retrieved from: https://www.jstor.org/stable/2535313

Blau, F. D., & Kahn, L. M. (2000). Gender differences in pay. *The Journal of Economic Perspectives, 14*(4), 75–99. Retrieved from: http://www.jstor.org/stable/2647076

Blau, F. D., & Kahn, L. M. (2006). The U.S. gender pay gap in the 1990s: Slowing convergence. *Industrial and Labor Relations Review*, 60(1), 45–66. Retrieved from: http://www.jstor.org/stable/25067574

Blau, F. D., & Kahn, L. M. (2007). The gender pay gap: Have women gone as far as they can? *The Academy of Management Perspectives, 21*(1), 7–23. Retrieved from: http://www.jstor.org/stable/4166284

Castilla, E. J. (2008). Gender, race, and meritocracy in organizational careers. *American Journal of Sociology, 113*(6), 1479–1526. doi:10.1086/588738

Cho, Y., & Newhouse, D. (2013). How did the great recession affect different types of workers? Evidence from 17 middle-income countries. *World Development, 41*, 31–50. doi:10.1016/j.worlddev.2012.06.003

Corsi, M., Botti, F., & D'Ippoliti, C. (2016). The gendered nature of poverty in the EU: Individualized versus collective poverty measures. *Feminist Economics, 22*(4), 82–100. doi:10.1080/13545701.2016.1146408

Cutler, D. M., Poterba, J. M., Sheiner, L. M., Summers, L. H., & Akerlof, G. A. (1990). An aging society: Opportunity or challenge? *Brookings Papers on Economic Activity, 1990*(1), 1–73. doi:10.2307/2534525

d'Albis, H., Bonnet, C., Navaux, J., Pelletan, J., Touban, H., & Wolff, F.-C. (2015). The lifecycle deficit in France, 1979–2005. *Journal of the Economics of Ageing, 5*, 79–85. doi:10.1016/j.jeoa.2014.09.005

Deaton, A. (1997). *The analysis of household surveys: A microeconometric approach to development policy*. Baltimore, MD: Johns Hopkins University Press.

Donehower, G. (2014). Incorporating gender and time use into NTA: National time transfer accounts methodology (Version 4, May 2014). *Internal materials of the NTA project,* 1–31.

England, P. (2010). The gender revolution uneven and stalled. *Gender & Society, 24*(2), 149–166. doi:10.1177/0891243210361475

Esping-Andersen, G. (2009). *Incomplete revolution: Adapting welfare states to women's new roles*. Cambridge: Polity Press.

European Commission. (2012). *2012 Ageing report: Economic and budgetary projection for the 27 EU member states 2010-2060* [Internal data].

European Commission (2013). *The impact of the economic crisis on the situation of women and men and on gender equality policies*. Luxembourg: Publications Office of the European Union.

European Commission. (2016). Justice – building a European area of justice: Equal economic independence. Retrieved July 18, 2016, from http://ec.europa.eu/justice/gender-equality/economic-independence/index_en.htm

European Trade Union Institute (2014). *Benchmarking Working Europe 2014*. Brussels: Author.

European Union Agency for Fundamental Rights. (2016). EU charter of fundamental rights: Article 23: Equality between women and men. Retrieved July 18, 2016, from http://fra.europa.eu/en/charterpedia/article/23-equality-between-women-and-men

Eurostat. (2013). *Revision of the European Standard Population: Report of Eurostat's task force.* Luxembourg: Publications Office of the European Union.

Eurostat. (2014a). *Eurostat database* [Data set]. Retrieved March, 10, 2014, from http://ec.europa.eu/eurostat/data/database

Eurostat. (2014b). *Students by ISCED level, age and sex* [Data set]. Retrieved March 13, 2014, from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_enrl1tl&lang=en

Eurostat. (2015a). *EU statistics on income and living conditions for years 2009, 2011, 2013* [On-demand microdata]. Luxembourg: Eurostat.

Eurostat. (2015b). *Population on 1 January by age and sex* [Data set]. Retrieved January 28, 2015, from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjan&lang=en

Eurostat. (2016a). *Employment rate of older workers, age group 55-64* [Data set]. Retrieved July 8, 2016, from http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tesem050&plugin=1

Eurostat. (2016b). *Gender employment gap* [Data set]. Retrieved February 13, 2016, from http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tesem060&plugin=1

Eurostat. (2016c). *Gender pay gap statistics* [Data set]. Retrieved May 15, 2016, from http://ec.europa.eu/eurostat/statistics-explained/index.php/Gender_pay_gap_statistics

Eurostat. (2016d). *Population, activity and inactivity: Annual average* [Data set]. Retrieved February 18, 2016, from http://ec.europa.eu/eurostat/data/database

Eurostat. (2016e). *Unemployment rate by age and sex* [Data set]. Retrieved February 2, 2016, from http://ec.europa.eu/eurostat/data/database?node_code=une_rt_a

Gollin, D. (2002). Getting income shares right. *Journal of Political Economy, 110*(2), 458–474. doi:10.1086/338747

Gruber, J., & Wise, D. A. (2002). *Social security programs and retirement around the world: Micro estimation* (Working Paper No. w9407). Retrieved from National Bureau of Economic Research: http://www.nber.org/papers/w9407

Hammer, B. (2014). *The economic life course: An examination using national transfer accounts* (Doctoral dissertation). Vienna: Vienna University of Technology.

Hammer, B., Prskawetz, A., & Freund, I. (2015). Production activities and economic dependency by age and gender in Europe: A cross-country comparison. *Journal of the Economics of Ageing, 5*, 86–97. doi:10.1016/j.jeoa.2014.09.007

Jaba, E., Pârțachi, I., Chistrugă, B., & Balan, C. B. (2015). Gender employment gap in EU before and after the Crisis. *Procedia Economics and Finance, 20*, 326–333. doi:10.1016/S2212-5671(15)00080-5

Kahn, L. M. (2014). New evidence on gender and the labour market: A symposium. *Industrial & Labor Relations Review, 67*(2), 283–286. doi:10.1177/001979391406700201

Kluge, F. A. (2014). The economic lifecycle by gender-results combining monetary and time use estimates. *Comparative Population Studies, 39*(4), 707–726. doi:10.12765/CPoS-2014-13en

Lee, R., & Mason, A. (2011). *Population aging and the generational economy: A global perspective.* Cheltenham: Edward Elgar.

Lee, S.-H., & Ogawa, N. (2011). Labor income over the lifecycle. In R. Lee & A. Mason (Eds.), *Population Aging and the Generational Economy: A Global perspective* (pp. 109–135). Cheltenham: Edward Elgar.

Loichinger, E., Hammer, B., Prskawetz, A., Freiberger, M., & Sambt, J. (2017). Quantifying economic dependency. *European Journal of Population, 33*(3), 351–380. doi:10.1007/s10680-016-9405-1

Luedicke, J. (2015). *SUPSMOOTH: Stata module to perform Friedman's super smoother* [Statistical software components]. Boston, MA: Boston College Department of Economics.

Lüth, E. (2001). *Private intergenerational transfers and population aging: The German case.* Heidelberg: Physica-Verlag HD.

Mandel, H., & Semyonov, M. (2014). Gender pay gap and employment sector: Sources of earnings disparities in the united states, 1970-2010. *Demography, 51*(5), 1597–1618. doi:10.1007/s13524-014-0320-y

Mincer, J. (1958). Investment in human capital and personal income distribution. *Journal of Political Economy, 70*(5), 55–79. Retrieved from: http://www.jstor.org/stable/1827422

Mincer, J., & Polachek, S. (1974). Family investments in human capital: Earnings of women. *Journal of political Economy, 82*(2), 76–108. Retrieved from: http://www.nber.org/chapters/c2973

Miranda, V. (2011). *Cooking, caring and volunteering: Unpaid work around the world* (OECD Social, Employment and Migration Working Paper No. 116). Retrieved from OECDiLibrary: http://www.oecd-ilibrary.org/social-issues-migration-health/cooking-caring-and-volunteering-unpaid-work-around-the-world_5kghrjm8s142-en

O'Neill, J., & Polachek, S. (1993). Why the gender gap in wages narrowed in the 1980s. *Journal of Labor Economics, 11*(1), 205–228. Retrieved from: http://www.jstor.org/stable/2535190

Organisation for Economic Co-operation and Development (2012). *Closing the gender gap: Act now, OECD publishing.* Retrieved from http://www.oecd.org/gender/closingthegap.htm

Pension and Disability Insurance Institute of Slovenia. (2016). *Average age of retirement*. Retrieved May 15, 2016, from http://www.zpiz.si/cms/?ids=content&inf=72

Perugini, C., & Selezneva, E. (2015). Labour market institutions, crisis and gender earnings gap in Eastern Europe. *Economics of Transition, 23*(3), 517–564. doi:10.1111/ecot.12072

Pittau, M. G., Yitzhaki, S., & Zelli, R. (2015). The 'Make-Up' of a regression coefficient: Gender gaps in the European labor market. *Review of Income and Wealth, 61*(3), 401–422. doi:10.1111/roiw.12094

Prskawetz, A., & Sambt, J. (2014). Economic support ratios and the demographic dividend in Europe. *Demographic Research, 30*, 963–1010. doi:10.4054/DemRes. 2014.30.34

Rippon, I., Kneale, D., de Oliveira, C., Demakakos, P., & Steptoe, A. (2014). Perceived age discrimination in older adults. *Age and Ageing, 43*(3), 379–386. doi:10.1093/ageing/aft146

Rubery, J. (2015). Austerity and the future for gender equality in Europe. *Industrial & Labor Relations Review, 68*(4), 715–741. doi:10.1177/0019793915588892

Sambt, J., & Malačič, J. (2011). Slovenia: Independence and the return to the family of European market economies. In R. Lee & A. Mason (Eds.), *Population Aging and the Generational Economy: A Global Perspective* (pp. 340–353). Cheltenham: Edward Elgar.

Samuelson, P. A., & Nordhaus, W. D. (2002). *Economics* (16th ed., B. Kovač, Trans.). Ljubljana: GV Založba.

Sanderson, W. C., & Scherbov, S. (2015). Are we overly dependent on conventional dependency ratios? *Population and Development Review, 41*(4), 687–708. doi:10.1111/j.1728-4457.2015.00091.x

Smith, M., & Villa, P. (2010). The ever-declining role of gender equality in the European employment strategy. *Industrial Relations Journal, 41*(6), 526–543. doi:10.1111/j.14682338.2010.00584.x

Statistical Office of the Republic of Slovenia (2014). *Household expenditure survey for years 2000, 2003, 2005, 2008, 2010 and 2012* [On-demand micro data]. Ljubljana: Statistical Office of the Republic of Slovenia.

United Nations. (2013). *National transfer accounts manual: Measuring and analysing the generational economy*. New York, NY: United Nations.

United Nations Educational, Scientific and Cultural Organization. (2015). *School life expectancy by level of education* [Data set]. Retrieved January 4, 2015, from http://data.uis.unesco.org/index.aspx?queryid=142&lang=en#

Zagheni, E., Zannella, M., Movsesyan, G., & Wagner, B. (2015). *A comparative analysis of European time transfers between generations and genders*. Dordrecht: Springer.

Zannella, M. (2015). Reallocation of resources between generations and genders in the market and non-market economy: The case of Italy. *Journal of the Economics of Ageing, 5*, 33–44. doi:10.1016/j.jeoa.2014.09.003