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The income situation of the self-employed and their capability of retirement provision

by Peter Kranzusch, Stefan Schneck, Hans-Jürgen Wolter
With contributions by Sören Ivens und Anja Sperr

IfM-Materialien Nr. 285

This English version has been machine-translated and the contents have been checked and adapted slightly by the authors.

Impressum

Publisher

Institut für Mittelstandsforschung Bonn
Maximilianstr. 20, 53111 Bonn
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Telefax +49/(0)228 / 72997 - 34

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IfM-Materialien Nr. 285

ISSN 2193-1852 (Internet)

ISSN 2193-1844 (Print)

Bonn, November 2020

Das IfM Bonn ist eine Stiftung
des privaten Rechts.

Gefördert durch:



Bundesministerium
für Wirtschaft
und Energie

aufgrund eines Beschlusses
des Deutschen Bundestages

Ministerium für Wirtschaft, Innovation,
Digitalisierung und Energie
des Landes Nordrhein-Westfalen



The income situation of the self-employed and their capability of retirement provision

Die Einkommenslage von Selbstständigen vor dem Hintergrund ihrer Altersvorsorgefähigkeit

Peter Kranzusch, Stefan Schneck, Hans-Jürgen Wolter with contributions by Sören Ivens, Anja Sperr

IfM-Materialien Nr. 285

Abstract

We examine German administrative tax data and find that six in ten self-employed individuals obtain annual incomes of less than 10,000 Euro with their entrepreneurial activity. However, many of these self-employed achieve additional incomes or partners contribute to household income. The self-employed are thus not necessarily unable to save for retirement despite low incomes from entrepreneurial activity. Besides, our results show that incomes from self-employment fluctuate over time so that periods with low incomes might be followed by periods with higher incomes. Our analysis is suggestive that most of the self-employed are able to save for retirement.

JEL: L26

Keywords: Income distribution, pension provision capability, self-employment, income tax

Zusammenfassung

Rund sechs von zehn Selbstständigen erzielen nach Einkommensteuerdaten Gewinneinkünfte von weniger als 10.000 € im Jahr. Eine Vielzahl dieser Personen kann jedoch auf zusätzliche eigene Einkünfte zurückgreifen oder es wird durch einen Partner bzw. eine Partnerin weiteres Einkommen generiert. Der Aufbau einer ausreichenden Altersvorsorge ist daher auch bei Selbstständigen mit geringen Gewinneinkünften durchaus realistisch. Darüber hinaus ist zu berücksichtigen, dass Gewinneinkommen erheblichen Schwankungen unterliegen: Phasen mit niedrigen Einkünften können unter Umständen durch Perioden mit höheren Gewinnen ausgeglichen werden. Gleichwohl gibt es Selbstständige, die dauerhaft in prekären finanziellen Verhältnissen verbleiben. Die meisten Selbstständigen sind jedoch in der Lage, eine Altersvorsorge anzusparen. Die Einführung einer Altersvorsorgepflicht für Selbstständige scheint daher nicht erforderlich. Hierbei ist auch zu berücksichtigen, dass eine solche Vorsorgepflicht mit schwierigen Abgrenzungsproblemen und vermutlich zusätzlichem, administrativem Aufwand verbunden wäre.

Schlagwörter: Einkommensverteilung, Altersvorsorgefähigkeit, Selbstständige, Einkommensteuer

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The most important facts in brief

In Germany, self-employed individuals need to prepare for their post-employment phase primarily on their own responsibility. Since the type and scope of self-employment have changed in recent decades, discussion emerged to create mandatory retirement provision systems for all self-employed individuals. Considering these developments, this study systematically analyzes the income situation of the self-employed using the Taxpayer-Panel.

Six in ten self-employed with low incomes from self-employment

In 2014, around six in ten of the approximately 6.8 million self-employed individuals generated incomes from self-employment of less than €10,000. Their income, which resulted solely from their self-employed activities, was thus below the basic tax allowance. The same applies - with minor deviations - to the other years under consideration.

More than half of the self-employed have other income

Individuals with low incomes from self-employment often improve their financial situation with additional incomes, many of them additionally have jobs as paid employees. However, about a quarter of all self-employed individuals have an annual income of less than €10,000, even when considering their total income, i.e. when all other incomes are added to the incomes from self-employment.

About 60% of the self-employed are taxed together with a partner. Two thirds of the jointly taxed low-income self-employed individuals exceed the taxable subsistence level, in some cases considerably, when taking into account the partner's income.

The ability to provide for old age should be considered over time

Fluctuating incomes are typical for many self-employed individuals. Accordingly, episodes of low income in one year can be compensated by higher incomes in other years. Consequently, income below the taxable subsistence level is for many people only an episode.

Compulsory retirement provision for self-employed individuals would be problematic

The results suggest that the proportion of self-employed individuals who are fundamentally unable to make adequate provision for their retirement phase is likely

to be relatively small. This is also indicated by the comparatively high assets that self-employed individuals build up over time and which they can draw on in old age to cover their livelihood. In addition, self-employed individuals with low incomes from self-employment who are additionally employed are also subject to pension insurance. The introduction of an obligatory old-age provision therefore does not appear to be necessary.

The need to harmonize different forms of old-age provision

Note that in case of varying employment status, the coexistence of different - sometimes occupation-specific - pension models can lead to complex and unclear situations. In such cases, a better integration of the various pension insurance systems would be worth considering, also to facilitate the development and transfer of old-age provision in the case of hybrid or changing acquisition models

1 Introduction

In general, people strive to stabilize their consumption in the course of their lives (see Campbell/Deaton 1989; Morduch 1995). Since it is only possible to pursue gainful employment to a limited extent or not possible at all at an advanced age, individuals must make provisions to cover their living expenses (see Schmähl et al. 2015). In Germany, the development of the industrial economy has led to the creation of a statutory pension insurance scheme for dependent employees with compulsory membership. Self-employed individuals were not covered by this system because the prevailing idea was that they tended to be wealthier than employees (see Betzelt/Fachinger 2004; Schulze Buschoff 2004). At this time, the idea was that the self-employed were able to provide for income risks on their own responsibility and did not require mandatory social insurance.

Whether and how self-employed individuals build up a retirement provision in the course of their working life has so far only been examined occasionally. For some forms of self-employment, pension schemes already exist. Other self-employed individuals in alternative occupations benefit from a voluntary or obligatory membership of the statutory pension insurance. Estimates on the number of self-employed individuals who make provisions for old age via the statutory pension insurance systems suggest that there will be around 1 million people insured in the statutory pension insurance or in professional pension schemes in 2015 (see Maier/Ivanov 2018).¹ Most self-employed individuals will have to make private provision.

In recent decades, both the forms and scope of self-employed individuals and their income potentials have changed. For example, currently every second self-employed individual is active in solo self-employment, who tend to earn significantly lower incomes than self-employed individuals with employees (see, for example, Maier/Ivanov 2018; Fritsch et al. 2015). In fact, a larger group of self-employed individuals earn such low incomes that they sometimes find themselves in precarious situations (see Burmeister 2016; Brenke 2013; Fritsch et al. 2015; Sorgner et al. 2017). For this reason, the present study examines whether self-employed individuals are still generally able to build up enough old-age

¹ This includes self-employed individuals who are insured either by law or upon request. Included are domestic craftsmen and solo self-employed persons with essentially only one client as well as obligation-insured persons of the professional pension schemes. Maier/Ivanov (2018, p. 42) as well as Zabel (2013) describe them as "obligatorily" insured persons.

provision on their own responsibility, as assumed in the design of the social security systems.

Most analyses of the income situation of self-employed individuals are based on cross-sectional data. The incomes of the self-employed, however, are frequently subject to significant fluctuations over time (see e.g. Burmeister 2016): Periods with low incomes or even losses may well be followed by periods with high profits, during which they may be able to build up savings. Burmeister (2016), for example, showed that over several years, self-employed individuals at the lower end of the income distribution are able to improve their income situation more often than employees: Already within a year almost one third of self-employed individuals move up from the lowest income quintile to a higher class. It is also known that low incomes can turn into high incomes in the long run, at least for some of the founders (e.g. Brink et al. 2018).

Self-employed individuals, for whom low incomes are transitory, are quite capable of accumulating a sufficiently large fortune for the retirement phase. However, this does not seem to be possible in all cases. Brenke (2016), for example, estimates that in 2013 about 670,000 self-employed individuals had neither a statutory or private (pension) insurance nor correspondingly large household assets (the lower limit was set to €250,000). According to Ziegelmeier (2010), 11 to 22% of all households with self-employed might in the future not be able to achieve pensions above the “subsistence level” (*Grundsicherungsniveau*).

In order to address such topics, this paper uses the Taxpayer-Panel to examine the income of self-employed individuals and their ability to prepare for their retirement: Are the incomes of the vast majority of self-employed individuals sufficiently high to at least build up incomes in old age that exceed the subsistence minimum?

The Taxpayer-Panel is particularly suitable for this purpose, as it contains administrative income tax data that almost completely reflect the income from self-employed individuals and enables the examination of income developments over time.

2 The Taxpayer-Panel

The Taxpayer-Panel (TPP)² allows the analysis of the structure and effects of the income tax as well as studies on the distribution of incomes (see Vorgrimler et al. 2006). The data set is particularly suitable for describing the income situation of the self-employed because it includes all persons who have filed a tax return at least twice. Taxpayers with income from self-employment are legally obliged to file a tax return. The data set thus includes almost all self-employed individuals (see Suprinovič/Kranzusch 2014).³ The taxpayers' income is recorded according to its sources:

- Incomes from self-employment. Three of the seven types of income mentioned in § 2 EstG (German Income Tax Law) are considered incomes from self-employment (income from agriculture and forestry (Einkünfte aus Land- und Forstwirtschaft), commercial operations (Gewerbebetrieb) and self-employment (selbstständiger Arbeit)). The reported numbers describe profits or losses of self-employed individuals, i.e. income after deduction of costs. This also includes gains from the sale of a business unit.
- Income from non-self-employment (remuneration from dependent employment, including civil servant pensions).
- Income from renting and leasing.
- Capital gains.
- Other income (pension payments from the statutory pension insurance (GRV) and independent company pension funds).

The TPP is designed to record income tax returns of taxpayers (Einkommensteuerpflichtige). These are basically natural persons. In the case of joint taxation of spouses or persons in registered partnerships, partners are treated as one taxpayer. However, individual information about incomes from employment is also available for these jointly taxed taxpayers (Individualnachweis), which implies that the analysis of the income situation at the individual level is possible in such cases (see Gerber/Hammer 2013; Suprinovič/Kranzusch 2014). Note

² Thanks to the RDC of the Federal Statistical Office and Statistical Offices of the Länder, especially Maurice Brandt, for assistance with data issues.

³ Note that owners of a corporation who receive a managing director's remuneration and thus a salary as employees, are not identifiable as self-employed persons. If managing directors of a GmbH or UG hold more than 50% of the GmbH shares or if a comprehensive blocking minority is agreed upon in the partnership agreement in the case of a share of up to 50%, they are not considered to be subject to social security and are therefore not subject to compulsory insurance in the statutory pension insurance.

that capital income is usually only allocated to the taxpayer. In case of couples, capital income is not distinguished by individual (see Dittrich et al. 2013). The data quality of the TPP can be considered high due to the official and administrative character and the legal obligation of the taxpayers to provide information.

The TPP contains data from more than 54 million taxpayers in the period from 2001 to 2014 (see Statistisches Bundesamt 2018). The analysis is restricted to self-employed individuals aged between 18 and 65 who are residents of Germany. Income variables were deflated based on the annual averages of the consumer price (overall) (2010=100; see Statistisches Bundesamt 2015) in order to eliminate inflation-related developments.

In 2014, around 6.8 million self-employed individuals recorded incomes from self-employment (see Table 1). The number of self-employed individuals observed in the TPP is around 1.2 million higher than the one reported in the Mikrocensus, which indicates 4.0 million full-time self-employed and 0.77 million part-time self-employed.⁴ This difference is mainly due to individuals who obtain incomes from self-employment, e.g. in the case incomes of privately used solar systems, from eBay sales or counselling activities. Those incomes must be reported in accordance with German Income Tax Law and are defined as incomes from self-employment. Individuals, however, do not report those self-employment activities in surveys because these activities are frequently not perceived as entrepreneurial. A further possible reason for the underreporting in survey data is that some self-employed individuals were self-employed for rather short periods (e.g. starting or ending their self-employment, seasonal work).

⁴ Projections based on the Mikrocensus, see the Statistics of the IfM Bonn (www.ifm-bonn.org).

Table 1: Individuals with incomes from self-employment in period 2001 to 2014

| Year | Number of individuals with incomes from self-employment | | | | Sum of incomes from self-employment | | |
|------|---|------------------|------------------|--|-------------------------------------|------------------|------------------|
| | total | with | | share of self-employed with positive incomes in % | total. | with | |
| | | negative incomes | positive incomes | | | negative incomes | positive incomes |
| | in thousands | | | | bn. € | | |
| 2001 | 5,590 | 1,239 | 4,351 | 77.8 | 134.8 | -17.7 | 152.5 |
| 2002 | 5,765 | 1,313 | 4,451 | 77.2 | 133.3 | -15.8 | 149.1 |
| 2003 | 5,889 | 1,367 | 4,522 | 76.8 | 132.8 | -13.6 | 146.4 |
| 2004 | 6,202 | 1,398 | 4,803 | 77.5 | 143.5 | -12.5 | 156.0 |
| 2005 | 6,350 | 1,369 | 4,981 | 78.4 | 156.3 | -10.8 | 167.1 |
| 2006 | 6,417 | 1,294 | 5,123 | 79.8 | 165.4 | -9.1 | 174.5 |
| 2007 | 6,504 | 1,240 | 5,264 | 80.9 | 172.3 | -9.4 | 181.7 |
| 2008 | 6,524 | 1,255 | 5,268 | 80.8 | 176.4 | -10.2 | 186.6 |
| 2009 | 6,571 | 1,340 | 5,232 | 79.6 | 160.4 | -10.2 | 170.6 |
| 2010 | 6,697 | 1,340 | 5,357 | 80.0 | 171.0 | -8.7 | 179.6 |
| 2011 | 6,840 | 1,324 | 5,516 | 80.6 | 179.6 | -7.7 | 187.3 |
| 2012 | 6,898 | 1,234 | 5,664 | 82.1 | 180.3 | -7.1 | 187.4 |
| 2013 | 6,919 | 1,232 | 5,687 | 82.2 | 181.9 | -6.8 | 188.8 |
| 2014 | 6,800 | 1,159 | 5,641 | 83.0 | 188.4 | -6.2 | 194.6 |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

About 1.2 million (17%) of the 6.8 million self-employed generated negative incomes from self-employment activities. Their losses amounted to € 6.2 billion. Over time, both the proportion of those who generate negative income from self-employment and the total losses have decreased.

3 The income situation of the self-employed from 2001 to 2014

In this chapter, we examine the income situation of the self-employed in detail. At first, we concentrate on the incomes from self-employment, which must not be examined in isolation, particularly when considering the capability to create provisions for retirement. We therefore also analyze the overall income situation of the self-employed on an individual level as well as in the household context. Finally, we address potentially fluctuating incomes of self-employed individuals and its relevance for retirement provision.

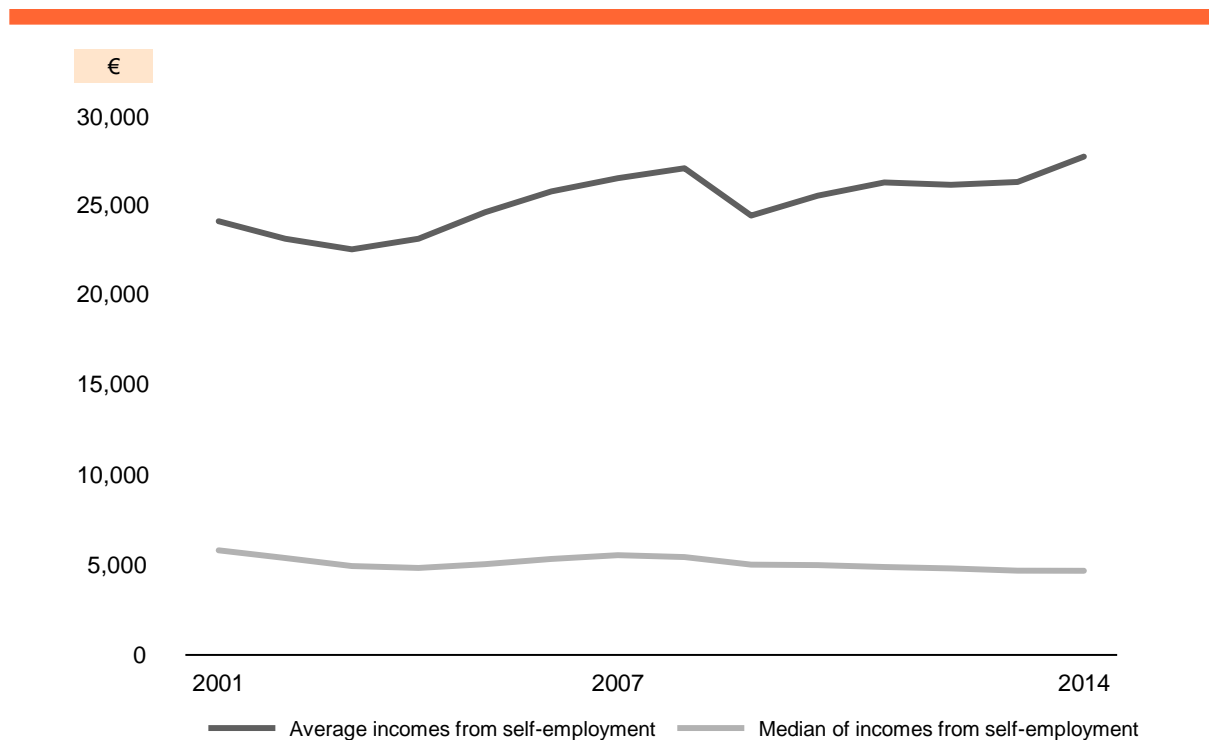
3.1 Incomes of the self-employed

3.1.1 Incomes from self-employment

In this section, we consider the reported incomes, which are solely attributable to self-employment. Further potential incomes are not yet considered. As expected, the incomes from self-employment differ considerably. The distribution of incomes from self-employment is positively skewed. The positive skewness increased over time (see Figure 1 and Table A1 in the appendix): While the median was just under 6,000 in 2001, around four times lower than the average (about €24,000), it had fallen to around €4,700 by 2014 – while the average increased at the same (roughly €28,000).⁵

⁵ Note that we consider the arithmetic mean, when referring to the average. When referring to the median, we consider the value that separates the higher half of incomes from the lower half.

Figure 1: Development of deflated incomes from self-employment from 2001 to 2014



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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

There is no general answer to the extent to which the above-mentioned development is problematic. On the one hand, the declining median value could be indicative of generally declining incomes from self-employment. On the other hand, it is also possible that the number of self-employed individuals working part-time or in addition to their regular jobs has risen significantly. The first scenario can be regarded more critically than the second when considering the capability to build-up retirement provisions.

In the following, we examine the development of incomes from self-employment by consideration of eight income classes. The lowest class describes negative incomes from self-employment. The threshold of €5,000 per year is roughly equivalent to the amount that can be earned with a minor (dependent) activity.⁶ Incomes from self-employment that are permanently below this threshold suggest that the self-employed individuals are not the taxpayer's primary source of income. The threshold value of 10,000 € is based on the basic allowance under

⁶ Until 2012, the monthly earnings limit was €400 (€4,800 per year). From 2013, it was changed to 450 € (5,400 € per year).

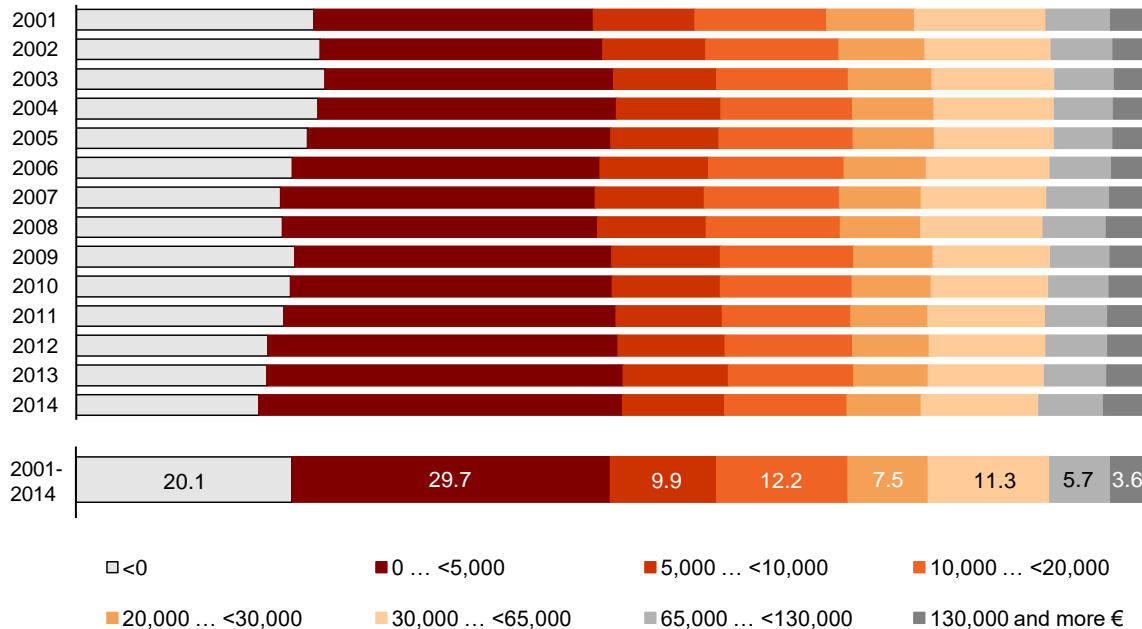
income tax law, which is intended to ensure that the minimum subsistence level remains tax-free (in the following, we simply use the term subsistence level). Incomes below this threshold are presumed not to be adequate to create an adequate old-age provision. Since we also consider possible partner income in the further course of the study, we draw the next limit at 20,000 €, i.e. the basic tax-free amount for both persons. The other limits are based on the basic values of the statutory pension insurance (GRV). The limit of 30,000 indicates the average income that was set as the basis in 2014 of a self-employed individual in the statutory pension insurance.⁷ The amount of 65,000 € per year describes approximately the maximum value, up to which retirement provision contributions must be deposited in the GRV (Beitragsbemessungsgrenze).⁸ This amount is doubled to 130.000 € per year for couples.

The proportion of self-employed individuals with losses declined over time (cf. Figure 2). The proportion of self-employed individuals with positive incomes up to €5,000, in turn, increased sharply: In 2001, around 1.5 million self-employed individuals achieved positive incomes below €5,000. This number had risen to 2.3 million in 2014 (see Table A2 in the appendix). The changes in the other classes have been smaller.

⁷ The reference value for members of the pension insurance scheme was set to 33,180 € per year in 2014 in West Germany and 28,140 € per year in the East Germany. For the year 2014, an average annual income of 34,857 € was set as the basis of assessment in the statutory pension insurance (see Appendix 1 in SGB VI).

⁸ The actual upper income threshold has risen within the observation period, so that we have used an approximation here.

Figure 2: Fraction of self-employed by income classes (in %): Income from self-employment



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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

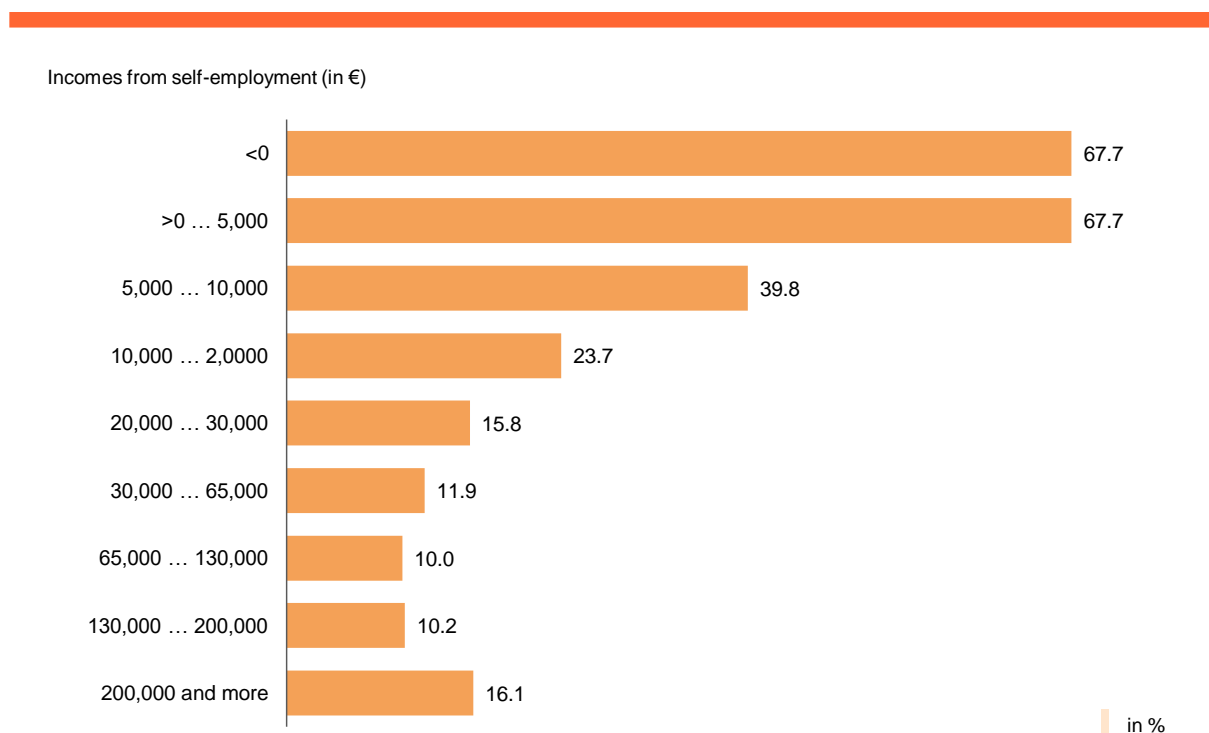
The share of self-employed individuals with incomes from self-employment below the basic tax-free allowance to secure the minimum subsistence level (€10,000 per year) amounted to about 60% in the considered time period. In all years, more than half of all self-employed individuals are not able to provide for old age purely with their incomes from self-employment. However, it cannot be concluded that more than half of the self-employed individuals cannot build-up savings for old age on a long-term basis, since incomes from self-employment might fluctuate over time. Besides, possible partner incomes and potential other sources of income of the self-employed individuals are not considered yet. The latter point is of special interest when taking the above-mentioned sharp rise in the number of self-employed individuals with low incomes from self-employment into account. If exactly those self-employed achieve additional incomes (e.g. from dependent employment), this could be an indication of an increase of part-time self-employment. In such cases, conclusions about the capability of retirement provisions should not be based solely on the incomes obtained in entrepreneurial activities.

3.1.2 Total incomes of the self-employed

As shown in the previous section, around 60% of self-employed individuals have incomes from self-employment below the basic tax-free allowance. For those individuals it might be hard to build-up any retirement provisions if no additional incomes are available. In the course of this section, we will therefore examine additional sources of income and individual total incomes.

Six in ten self-employed individuals not only obtain incomes from self-employment. In most cases, individuals earn wages from dependent employment (see table 2). In fact, as many as 44 % of all self-employed individuals receive wages in addition to their incomes from self-employment. However, the wages differ significantly by the level of incomes from self-employment: Particularly individuals with very low incomes from self-employment (up to 5,000 €) are comparably often engaged as paid employees (more than two thirds, see Figure 3).

Figure 3: Share of self-employed individuals with additional incomes from paid employment by incomes of self-employment from 2001 to 2014



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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

Table 2: Self-employed with additional incomes

| Year | Self-employed Total number in thousands | paid employment (wages) | with incomes from... | | | | without additional incomes | |
|------------|--|-------------------------|----------------------|------------------|------------------|------------------|----------------------------|--|
| | | | Renting and leasing | | capital assets | | | |
| | | | positive incomes | negative incomes | positive incomes | negative incomes | | |
| Share in % | | | | | | | | |
| 2001 | 5,590 | 44.1 | 11.5 | 16.7 | 12.1 | 1.0 | 37.3 | |
| 2002 | 5,765 | 43.8 | 11.6 | 16.2 | 10.4 | 1.1 | 38.2 | |
| 2003 | 5,889 | 43.1 | 11.9 | 15.7 | 9.7 | 0.9 | 39.2 | |
| 2004 | 6,202 | 42.0 | 12.2 | 14.6 | 10.2 | 1.0 | 40.4 | |
| 2005 | 6,350 | 41.4 | 12.5 | 13.8 | 10.2 | 0.9 | 41.4 | |
| 2006 | 6,417 | 41.4 | 12.6 | 13.2 | 10.7 | 1.1 | 41.3 | |
| 2007 | 6,504 | 42.1 | 13.1 | 12.5 | 17.8 | 1.1 | 38.8 | |
| 2008 | 6,524 | 42.8 | 13.3 | 12.1 | 19.2 | 1.2 | 37.8 | |
| 2009 | 6,571 | 43.4 | 13.7 | 11.4 | 4.7 | 0.1 | 41.7 | |
| 2010 | 6,697 | 44.3 | 14.2 | 10.8 | 4.1 | 0.1 | 41.4 | |
| 2011 | 6,840 | 45.6 | 14.7 | 10.4 | 4.0 | 0.1 | 40.3 | |
| 2012 | 6,898 | 46.6 | 15.4 | 9.9 | 3.9 | 0.1 | 39.5 | |
| 2013 | 6,919 | 47.5 | 15.9 | 9.4 | 3.4 | 0.1 | 38.9 | |
| 2014 | 6,800 | 48.6 | 16.9 | 8.8 | 2.9 | 0.1 | 37.9 | |
| Period | | 44.1 | 13.6 | 12.4 | 8.6 | 0.6 | 39.6 | |

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Italic: Under-reporting due to changes in the taxation of capital income.

Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

The detailed analysis of wages from paid employment reveals that these earnings are partly substantial – especially among those individuals with low incomes from self-employment (see Table 3).

Table 3: Self-employed with additional wages from paid employment

| Individuals with incomes from self-employment amount from... to ... (in €) | Individuals with gross wages from paid employment amount from ... to ... (in €) | | | | | | | | Total | Share with respect to all observations in % |
|--|---|----------------|-----------------|-----------------|-----------------|------------------|-------------------|------------------|-------|---|
| | < 5,000 | 5,000 - 10,000 | 10,000 - 20,000 | 20,000 - 30,000 | 30,000 - 65,000 | 65,000 - 130,000 | 130,000 - 200,000 | 200,000 and more | | |
| | share by row in % | | | | | | | | | |
| < 0 | 6.4 | 6.2 | 13.2 | 16.0 | 41.9 | 12.8 | 2.1 | 1.4 | 100.0 | 30.9 |
| >0 - 5,000 | 9.2 | 7.3 | 13.5 | 15.1 | 40.8 | 11.9 | 1.4 | 0.8 | 100.0 | 45.5 |
| 5,000 - 10,000 | 14.9 | 11.0 | 15.2 | 13.5 | 31.3 | 11.4 | 1.6 | 1.1 | 100.0 | 8.9 |
| 10,000 - 20,000 | 15.9 | 11.7 | 15.6 | 12.4 | 27.5 | 13.2 | 2.3 | 1.5 | 100.0 | 6.6 |
| 20,000 - 30,000 | 15.7 | 11.5 | 15.2 | 11.5 | 25.2 | 15.5 | 3.3 | 2.1 | 100.0 | 2.7 |
| 30,000 - 65,000 | 14.4 | 10.5 | 14.1 | 10.5 | 23.1 | 18.9 | 5.2 | 3.4 | 100.0 | 3.1 |
| 65,000 - 130,000 | 12.6 | 9.1 | 12.2 | 9.0 | 19.6 | 22.6 | 8.4 | 6.4 | 100.0 | 1.3 |
| 130,000 - 200,000 | 10.3 | 7.8 | 10.7 | 7.8 | 17.5 | 25.3 | 10.7 | 9.9 | 100.0 | 0.4 |
| 200,000 and more | 6.9 | 5.7 | 8.4 | 6.7 | 16.3 | 25.5 | 12.3 | 18.3 | 100.0 | 0.6 |

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Number of observations: 39,687,967.

Sum of observations over all years.

Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

More than half of individuals with incomes from self-employment of less than 5,000 € received a gross wage of more than 30,000 €. This applies to roughly 45 % of the persons with a profit income between 5,000 and 20,000 €.

The combination of low incomes from self-employment and, at least in some cases, comparably high gross wages indicates that a substantial portion of these persons are primarily in dependent employment, while self-employment seems to be a side job (e.g., computer scientists offering computer services or employed craftsmen performing additional repair work). In such cases, therefore, a precarious financial situation cannot be expected per se and problems in building up a retirement provision might not generally exist. However, the opposite cannot be ruled out: i.e. dependent employment is started additionally in order to keep the business running despite (temporarily) poor business conditions. Besides, note that also business founders as well as those exiting self-employment achieve incomes from self-employment as well as dependent employment during a year. In the latter cases, the income tax data indicates hybrid entrepreneurship (cf. Kay et al. 2018), whereas individuals never were active in professional activities at the same time.

In addition to wages, self-employed individuals often receive income from renting and leasing. Approximately every fourth self-employed individual has such incomes (see Table 2 and Table A3 in the appendix). The relatively high proportion of individuals with negative income from renting and leasing is probably due to tax reasons.⁹ Another source of income for self-employed individuals is income from capital assets (see Table 2 and Table A3 in the appendix). In principle, these could be indications of the existence of assets to secure the livelihood during the retirement phase. However, incomes from capital assets are systematically under-recorded due to tax allowances and the change in the taxation methodology in 2009. In years 2007 and 2008, at least one in five individuals paid taxes on income from capital assets (1.3 million self-employed individuals) – this number decreased sharply until 2014 due to under-reporting because of the changes in the tax law.

When examining the different sources of income, the income from self-employment often represents a fraction of the total income. In fact, the other types of income often exceed the incomes from self-employment, so that the total income

⁹ For example, acquisition or production costs can be amortized over a period of 50 years. In the case of modernization expenses, the corresponding period is significantly shorter.

can be decent (see Tables 4 and A4): The average of the total incomes (about 45.000 €) exceeds the average of the profit incomes considerably (approximately 25,000 €). The discrepancy is even more pronounced for the respective median values, whereby the median of total income (25,336 €) is approximately five times as high as the incomes from self-employment (5,071 €). This indicates that many self-employed individuals with low incomes from self-employment achieve an adequate income, albeit not a very high one.

Table 4: Total income of self-employed individuals

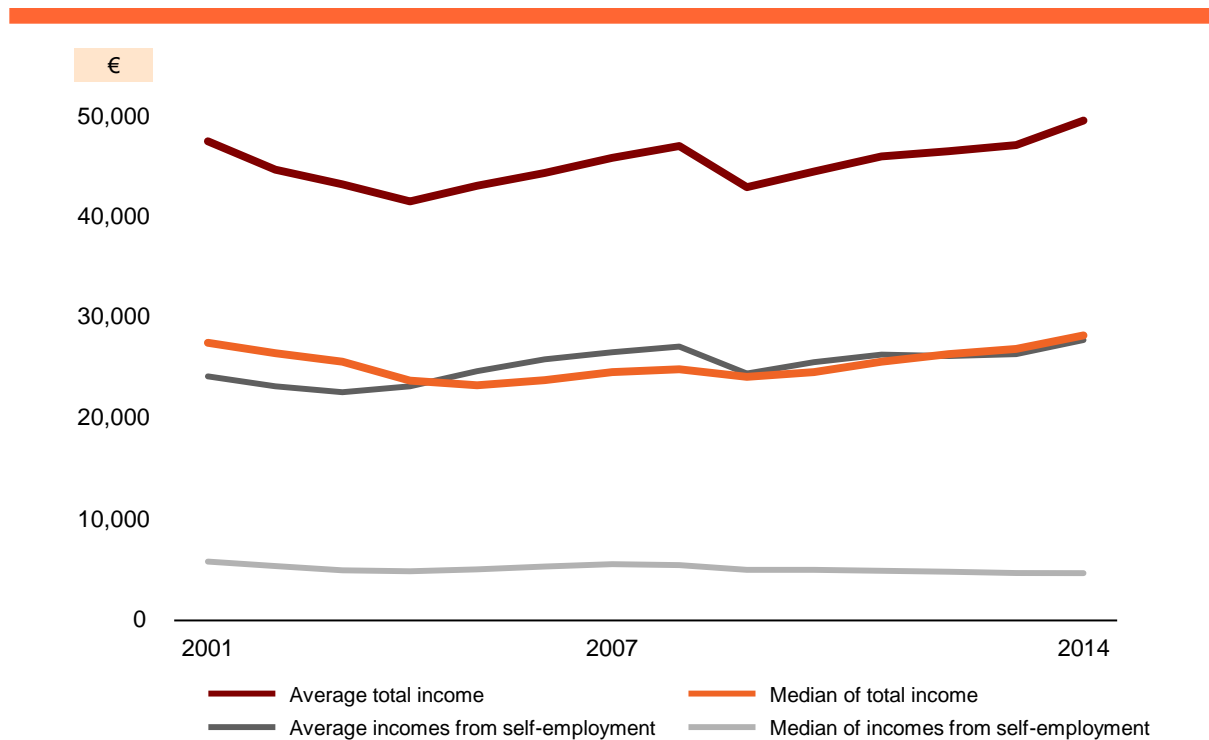
| Year | individuals in thousands | Total income by percentile | | | | | | | | | |
|--------------|---------------------------------|----------------------------|---------|--------|-------|--------|-----------------------------|--------|--------|---------|---------|
| | | mean in € | p1 | p5 | p10 | p25 | p50 (median) in € | p75 | p90 | p95 | p99 |
| 2001 | 5,590 | 47,334 | -13,184 | 2 | 2,517 | 11,193 | 27,431 | 50,670 | 90,561 | 136,316 | 342,632 |
| 2002 | 5,765 | 44,543 | -14,157 | 0 | 2,133 | 10,453 | 26,419 | 49,426 | 87,657 | 131,025 | 314,658 |
| 2003 | 5,889 | 43,097 | -13,266 | 0 | 1,691 | 9,657 | 25,554 | 48,600 | 86,268 | 128,712 | 301,973 |
| 2004 | 6,202 | 41,392 | -22,312 | -2,992 | 330 | 7,679 | 23,669 | 47,211 | 85,202 | 128,641 | 310,443 |
| 2005 | 6,350 | 42,943 | -19,058 | -2,414 | 501 | 7,735 | 23,230 | 46,805 | 85,278 | 129,891 | 325,041 |
| 2006 | 6,417 | 44,202 | -16,000 | -1,706 | 791 | 8,176 | 23,748 | 47,662 | 87,134 | 133,297 | 337,413 |
| 2007 | 6,504 | 45,695 | -14,958 | -1,180 | 1,107 | 8,706 | 24,512 | 48,615 | 89,849 | 138,656 | 351,168 |
| 2008 | 6,524 | 46,862 | -14,440 | -880 | 1,324 | 9,021 | 24,791 | 49,264 | 92,435 | 144,002 | 368,076 |
| 2009 | 6,571 | 42,804 | -14,559 | -956 | 1,209 | 8,734 | 24,049 | 47,512 | 87,835 | 134,955 | 324,727 |
| 2010 | 6,697 | 44,340 | -12,623 | -654 | 1,443 | 9,105 | 24,533 | 48,456 | 89,267 | 136,974 | 332,817 |
| 2011 | 6,840 | 45,836 | -10,758 | -239 | 1,881 | 9,794 | 25,567 | 49,743 | 91,448 | 140,093 | 340,729 |
| 2012 | 6,898 | 46,370 | -9,847 | 1 | 2,180 | 10,251 | 26,297 | 50,558 | 92,222 | 140,754 | 339,090 |
| 2013 | 6,919 | 46,960 | -9,084 | 76 | 2,334 | 10,514 | 26,826 | 51,306 | 93,412 | 142,443 | 345,022 |
| 2014 | 6,800 | 49,379 | -8,293 | 224 | 2,752 | 11,355 | 28,157 | 53,304 | 97,236 | 148,793 | 361,281 |
| Total period | | 45,168 | -13,769 | -527 | 1,501 | 9,440 | 25,336 | 49,262 | 89,810 | 137,016 | 336,124 |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

With exception of the years of the economic and financial crisis, total income tended to rise more rapidly than incomes from self-employment (see Figure 4). The improvement in the income situation of self-employed individuals is thus largely attributable to an increase in the other types of income.

Figure 4: Development of deflated total incomes of self-employed individuals from 2001 to 2014

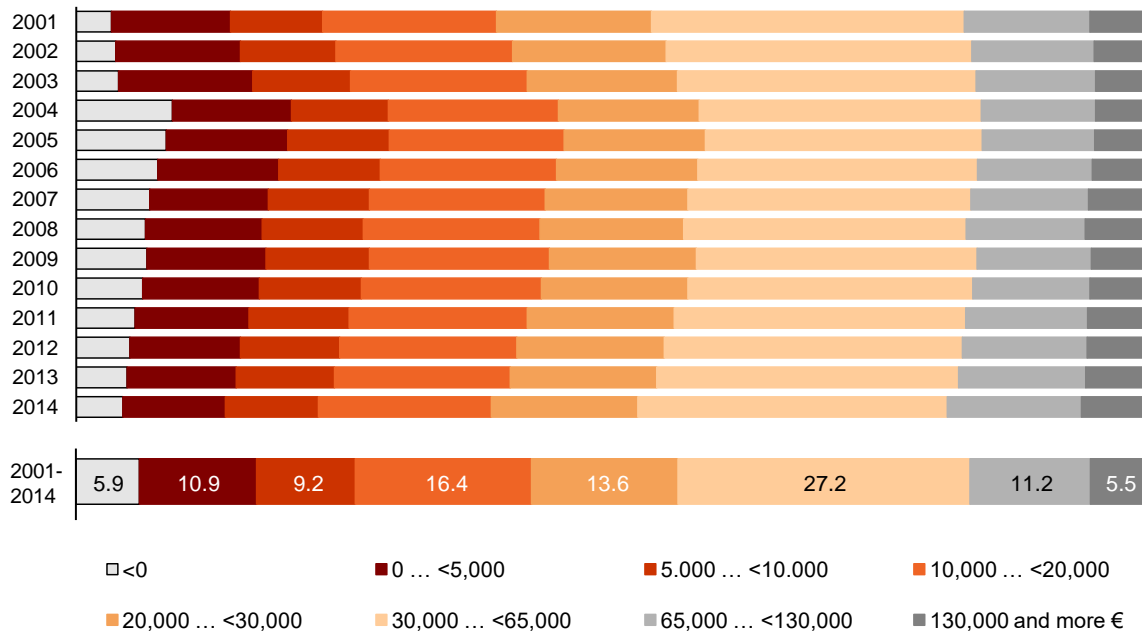


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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

Many people with low incomes from self-employment can improve their financial situation with additional incomes. For example, only about a quarter of self-employed individuals have a total income of less than €10,000 per year (see Figure 5 and Table A4). This proportion also tended to decline slightly since the mid-2000s. The income situation of most self-employed individuals is therefore less precarious than the sometimes very low incomes from self-employment suggest at first glance. Nevertheless, the total income of a quarter of self-employed individuals is below the basic tax-free allowance. They will therefore hardly be able to build-up an adequate retirement provision on their own.

Figure 5: Fraction of self-employed by income classes (in %): Total income



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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

3.2 Total income by type of taxpayer: Individual vs. joint taxation

As was shown in the previous chapter, a considerable fraction of self-employed individuals achieves comparatively low incomes from self-employment, which seems not enough to cover their living expenses and certainly not to build up an adequate retirement provision. However, many of these people have additional incomes. Nevertheless, about each fourth of all considered self-employed individuals do not achieve incomes beyond the subsistence level, even when taking additional incomes into account. Many self-employed individuals, though, are married or live in partnerships and form an economic unit with their partners (see e.g. Carter et al. 2017). In the next step, we will therefore investigate the extent to which existing partners can support the creation of an adequate pension plan. In this regard, the TPP allows to distinguish between individually taxed taxpayers (taxpayer is one single person) and joint taxation, where the taxpayer consists of two individuals, who are living in registered partnerships or are married (joint taxation, *Zusammenveranlagung*). In the data, roughly 60% of self-

employed individuals in the years 2001 to 2014 were jointly assessed with a partner.¹⁰

When differentiating between individual and joint taxation, there are clear differences between the two types of total incomes (see Table 5). Among the individually taxed self-employed individuals, only about one in three achieve a total income of at least 30,000 €, which corresponds approximately to the average income in the calculation models of the GRV. In contradiction, such incomes are rare among the jointly taxed self-employed. About 87% of this group have a total income of more than 20,000 €.

Table 5: Total incomes by type of taxpayer

| Individuals with total incomes amount from... to ... (in €) | total income individually taxed taxpayer | | | total income jointly taxed taxpayer | | |
|---|--|------------|-----------|-------------------------------------|------------|-----------|
| | Number of observations | Share in % | Cumulated | Number of observations | Share in % | Cumulated |
| < 0 | 1,886,089 | 5.3 | 5.3 | 930,820 | 1.7 | 1.7 |
| >0 - 5,000 | 3,792,632 | 10.7 | 16.0 | 991,720 | 1.8 | 3.6 |
| 5,000 - 10,000 | 4,182,915 | 11.8 | 27.8 | 1,296,205 | 2.4 | 6.0 |
| 10,000 - 20,000 | 7,279,552 | 20.5 | 48.3 | 3,858,404 | 7.2 | 13.1 |
| 20,000 - 30,000 | 5,496,314 | 15.5 | 63.8 | 5,749,604 | 10.7 | 23.8 |
| 30,000 - 65,000 | 8,894,485 | 25.1 | 88.9 | 20,594,625 | 38.2 | 62.1 |
| 65,000 - 130,000 | 2,785,025 | 7.8 | 96.7 | 13,885,172 | 25.8 | 87.8 |
| 130,000 - 200,000 | 623,906 | 1.8 | 98.5 | 3,535,373 | 6.6 | 94.4 |
| 200,000 and more | 538,385 | 1.5 | 100.0 | 3,018,946 | 5.6 | 100.0 |
| Total | 35,479,303 | 100.0 | | 53,860,869 | 100.0 | |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

A large proportion of the self-employed with low incomes are above the (tax) subsistence level when their partner's income is considered (see Table 6). In some cases, even comparatively high couple incomes are achieved. For

¹⁰ A total of 89,966,404 observations are available for incomes from self-employment, of which 54,486,311 were from individuals in registered partnerships. For total income, the numbers are marginally lower (53,860,869 of 89,340,172).

example, around 19% of jointly taxed self-employed individuals with a negative total income achieve a joint total income of at least €65,000. This indicates that partner incomes might contribute to the ability to jointly build up an adequate retirement provision - even when incomes from self-employment are low. However, about one third of the jointly taxed self-employed individuals with a low total income (up to 10,000 €) do not achieve total incomes exceeding the joint subsistence level (about 20,000 €).

Almost 40% of all self-employed individuals are taxed individually. This does not necessarily mean that a partnership does not exist, as tax law allows couples to decide against a joint and in favor of an individual taxation. In most cases, however, it can be assumed that these are self-employed individuals without a partner. In this group, about one in four (27.8 %) of the self-employed achieve total incomes below the subsistence level (see Table 5).

Table 6: Joint income of jointly taxed taxpayers by individual total income of the self-employed (in %)

| Individual total in- come of self-em- ployed individuals amount from... to ... (in €) | Joint incomes of partners in registered partnerships amount from... to ... (in €) | | | | | | | | | Total | Share with re- spect to all obser- vations in % | Share w.r.t. in- comes below 10.000 € |
|---|--|-----------|-------------------|--------------------|--------------------|--------------------|---------------------|----------------------|---------------------|-------|--|---|
| | < 0 | 0 - 5,000 | 5,000 - 10,000 | 10,000 - 20,000 | 20,000 - 30,000 | 30,000 - 65,000 | 65,000 - 130,000 | 130,000 - 200,000 | 200,000 and more | | | |
| < 0 | 25.1 | 3.7 | 3.7 | 8.7 | 11.8 | 28.4 | 12.5 | 3.2 | 3.0 | 100.0 | 6.2 | 33.9 |
| >0 - 5,000 | 0.7 | 14.1 | 5.3 | 11.2 | 13.6 | 38.0 | 13.2 | 2.3 | 1.6 | 100.0 | 11.1 | 37.3 |
| 5,000 - 10,000 | 0.3 | 0.4 | 20.3 | 15.9 | 14.9 | 33.7 | 11.1 | 2.0 | 1.4 | 100.0 | 7.5 | 26.6 |
| 10,000 - 20,000 | 0.2 | 0.1 | 0.3 | 29.8 | 17.8 | 36.6 | 12.2 | 1.8 | 1.2 | 100.0 | 13.7 | 1.3 |
| 20,000 - 30,000 | 0.1 | 0.0 | 0.1 | 0.6 | 38.3 | 44.2 | 13.8 | 1.8 | 1.1 | 100.0 | 12.4 | 0.4 |
| 30,000 - 65,000 | 0.1 | 0.0 | 0.0 | 0.1 | 0.4 | 66.8 | 29.5 | 2.2 | 1.1 | 100.0 | 28.6 | 0.4 |
| 65,000 - 130,000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 80.4 | 15.5 | 3.3 | 100.0 | 13.5 | 0.1 |
| 130,000 - 200,000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 76.1 | 22.6 | 100.0 | 3.6 | 0.0 |
| 200,000 and more | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.7 | 99.2 | 100.0 | 3.3 | 0.0 |
| Total | 1.7 | 1.8 | 2.4 | 7.2 | 10.7 | 38.2 | 25.8 | 6.6 | 5.6 | 100.0 | 100.0 | 6.0 |

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Number of observations: 53,860,869

Aggregated numbers over all years.

Gray: Below the joint taxable subsistence level of registered partners.

Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

3.3 Income fluctuations and employment history of self-employed individuals: 2010 - 2014

The investigation so far, was limited to cross sections. However, incomes of self-employed individuals are subject to considerable fluctuations over time. Therefore, it can be presumed that self-employed individuals can build-up enough retirement provision in the long run if temporarily low incomes are compensated by higher incomes in other periods. In the following, we therefore examine the development of the income of self-employed individuals over the course of several years.

The introduction of a personal identification number ("Steuer-ID") in 2010 allows for the examination of income growth by individual. The analysis of income fluctuations over time therefore starts in year 2010. Furthermore, we restrict the sample to individuals for whom information on incomes from self-employment is available in 2010 and who submitted a income tax form in all years from 2010 to 2014. Finally, we consider self-employed individuals who were between 18 and 59 years old in 2010 to exclude individuals reaching the standard retirement age (65 years) by 2014. The final sample consists of about 5.3 million individual observations.

Employment histories differ for the considered individuals and we identified three general patterns (see Table 7): Most of the individuals surveyed generated income from self-employment in all years (79.3 %), followed by those who exited self-employment (17.3 %). The third category, interrupted self-employment histories, are rather seldom.¹¹

¹¹ It can be assumed that the number of terminated and interrupted self-employment histories is underestimated. This is partly due to cases in which self-employment is terminated, but no tax return has been submitted.

Table 7: Classification of employment histories of self-employed individuals

| Self-employment history | Year | | | | | Individuals | |
|-----------------------------|------|------|------|------|------|--------------|-------|
| | 2010 | 2011 | 2012 | 2013 | 2014 | in thousands | in % |
| Continuous self-employment | | | | | | 4,190.3 | 79.3 |
| Exit | | | | | | 910.3 | 17.2 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Interrupted self-employment | | | | | | 180.2 | 3.4 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Cohort 2010 total | | | | | | 5,280.7 | 100.0 |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

Many of the continuously self-employed individuals with low total income in 2010 achieved a significantly higher income in at least one of the subsequent years from 2011 to 2014 (see Table 8). The self-employed individuals with losses in 2010 have partly achieved considerable income improvements, which is indicated by the comparatively high average maximum value of almost €33,000. But even the median is still above €11,000, i.e. most self-employed individuals from this group can achieve incomes above the basic tax-free allowance in at least one of the following years. Most self-employed individuals, whose total taxable income in 2010 was below the subsistence level, also reported an improvement in income in at least one of the following years. This result is in line with the findings of Burmeister (2016), who showed that many self-employed are able to improve their income situation.

Table 8: Maximum annual total income between 2011 and 2014 by total income in year 2010

| Individual total income of self-employed individuals amount from... to ... (in €) | Self-employment history | | | | | |
|---|----------------------------|---------|---------|---------|-----------------------------|---------|
| | Continuously self-employed | | Exit | | Interrupted self-employment | |
| | Mean | Median | Mean | Median | Mean | Median |
| | in € | | | | | |
| < 0 | 32,675 | 11,353 | 19,580 | 12,081 | 21,695 | 9,343 |
| >0 - 5.000 | 14,031 | 8,678 | 17,795 | 13,874 | 15,086 | 9,754 |
| 5.000 - 10.000 | 20,103 | 14,215 | 22,154 | 18,041 | 21,402 | 16,032 |
| 10.000 - 20.000 | 27,151 | 21,860 | 25,654 | 22,063 | 27,073 | 21,720 |
| 20.000 - 30.000 | 37,729 | 31,945 | 32,996 | 29,692 | 34,504 | 30,124 |
| 30.000 - 65.000 | 59,152 | 51,925 | 51,371 | 47,165 | 54,772 | 49,558 |
| 65.000 - 130.000 | 117,419 | 101,921 | 101,219 | 89,965 | 108,175 | 93,441 |
| 130.000 and more | 405,474 | 236,899 | 299,334 | 189,153 | 366,483 | 207,245 |
| Total | 72,888 | 39,891 | 42,981 | 30,826 | 54,452 | 34,297 |
| Number of observations | 4,190,263 | | 910,255 | | 180,226 | |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

The maximum values might describe positive outliers. However, the positive picture above can by no means generally be attributed to a single particularly good year, as a look at the average total income - by total income in 2010 - reveals (see Table 9). The respective values are naturally lower than when the maximum values are considered, but the general patterns are comparable: Usually, more than half of the low-income self-employed in 2010 managed to improve their income situation in the following years.

Table 9: Average annual total income between 2011 and 2014 by total income in year 2010

| Individual total income of self-employed individuals amount from... to ... (in €) | Self-employment history | | | | | |
|---|----------------------------|---------|----------------------------|---------|----------------------------|---------|
| | Continuously self-employed | | Beendete Selbstständigkeit | | Continuously self-employed | |
| | Mean | Median | Mean | Median | Mean | Median |
| | in € | | | | | |
| < 0 | 13,290 | 4,299 | 10,232 | 6,115 | 9,473 | 3,795 |
| >0 - 5.000 | 8,294 | 5,125 | 11,317 | 8,483 | 8,803 | 5,556 |
| 5.000 - 10.000 | 13,195 | 10,102 | 15,154 | 12,456 | 13,599 | 10,441 |
| 10.000 - 20.000 | 19,280 | 16,873 | 19,165 | 17,280 | 18,779 | 16,532 |
| 20.000 - 30.000 | 28,624 | 26,663 | 26,220 | 25,542 | 26,385 | 25,710 |
| 30.000 - 65.000 | 47,597 | 44,500 | 42,957 | 41,488 | 44,908 | 43,453 |
| 65.000 - 130.000 | 93,735 | 86,752 | 82,054 | 79,114 | 86,796 | 82,178 |
| 130.000 and more | 298,847 | 195,602 | 196,076 | 154,361 | 236,395 | 168,935 |
| Total | 54,946 | 31,813 | 32,733 | 23,916 | 39,938 | 26,702 |
| Number of observations | 4,190,263 | | 910,255 | | 180,226 | |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

Note that our analysis refers to a five-year period. For this reason, the significant income changes are quite remarkable. This suggests that low incomes of self-employed individuals are often only a temporary phenomenon, which is in line with the findings of Pahnke et al. (2019), who showed that self-employed individuals receiving unemployment benefits II (Arbeitslosengeld II) managed to improve their income situation and were no longer receiving those benefits after a short period of time. Thus, a low income at a certain point in time might not be a fundamental obstacle to building up a (sufficient) retirement provision.

4 The importance of assets for pension provision

So far, we have dealt with the level of income of self-employed individuals and their resulting capabilities to build up an adequate retirement provision. This methodological approach describes an indirect way to examine the old-age provision of self-employed individuals. We, therefore, focus on the actual capital formation of the self-employed individuals in this chapter. Since the TPP contains only income data and no information about wealth, we rely on existing studies.

The assets, which are tied up in the enterprise are often regarded as a classical form of the retirement provisions of self-employed individuals. Similar to income, the distribution of business assets among self-employed individuals is highly asymmetrical: The median value (€20,000) is well below the average value (€350,000, see Deutsche Bundesbank 2016, p. 35). This is at least partly due to the company life circle and the age of the self-employed individuals: It is intuitively obvious that the business assets during or shortly after the start-up phase tend to be lower than after decades of successful entrepreneurship. Also business size matters: More than half of the self-employed with employees have business assets. The proportion is significantly smaller among the solo self-employed (17%, see Table 10).

Table 10: Assets in households by employment type, % of households

| Assets | Solo self-employed | Self-employed with employees | Paid employees |
|--|--------------------|------------------------------|----------------|
| Business assets | 16.9 | 51.7 | 3.9 |
| Real Estate Ownership | | | |
| Owner-occupied residential property | 53.8 | 69.8 | 47.8 |
| Owner-occupied residential property, debt-free | 30.9 | 36.7 | 31.4 |
| Rented properties (in 2015) | 20.0 | 31.9 | 10.6 |
| Other investments | | | |
| Savings book, call money account etc. | 65.8 | 72.6 | 70.5 |
| Building loan agreement | 39.1 | 42.2 | 49.2 |
| Life insurance | 50.6 | 64.3 | 53.5 |
| Fixed-interest securities | 9.2 | 15.6 | 7.6 |
| Other securities (shares, funds, etc.) | 32.1 | 35.4 | 26.1 |
| None of the above | 16.8 | 10.0 | 16.1 |

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Source: Maier/Ivanov 2018, p. 41 (Basis: SOEP 2016).

Self-employed with employees and solo self-employed differ with respect to assets. This is not only restricted to business assets, but also to real estate ownerships or life insurance and fixed-interest securities, which are frequently used by self-employed individuals to build up retirement provisions. Solo self-employed persons have less property ownership than self-employed persons with employees. Nevertheless, also many solo self-employed own real estate, which can help to compensate possible problems with the structure of a suitable age

precaution to a certain degree because rent payments can be avoided when living in own properties. Especially in comparison to dependent employees, self-employed individuals also own much more frequently rented real estate, which also provides additional income. Furthermore, the proportion of security owners among self-employed individuals is higher than among paid employees. Most self-employed individuals thus seem to be keen and able to make provisions for retirement by accumulating assets.

A similar pattern arises when examining the amount of assets that self-employed individuals have accumulated (see Table 11). Both the average value and the median are significantly higher than the ones of paid employees. In this regard, the median assets of the self-employed are almost four times as high as those of paid employees. This leads to the conclusion that not only a few very high assets of very few self-employed are responsible for the differences.

Table 11: Amount of assets (in €) of private households with self-employed or dependent employees as main earners 2018

| Assets | Self-employed | | Paid employees | |
|--|------------------|----------------|--------------------|---------------|
| | mean | Median | Mean | Median |
| Gross monetary assets | 125,200 | 49,300 | 54,300 | 21,500 |
| Residual consumer credit debts | 2,900 | 0 | 3,300 | 0 |
| Educational credit debts | 700 | 0 | 800 | 0 |
| Net cash assets | 121,600 | 45,600 | 50,300 | 18,400 |
| Market value of real estate | 316,500 | 170,000 | 133,100 | 0 |
| Residual mortgage debt | 64,400 | 0 | 39,000 | 0 |
| Gross total assets | 441,600 | 254,200 | 187,400 | 72,900 |
| Total liabilities | 69,300 | 2,500 | 43,500 | 2,000 |
| Total assets | 372,400 | 192,000 | 143,900 | 48,700 |
| (Number of households and extrapolated numbers in parentheses) | 2,295 (2,866) | | 33,358 (22,363) | |

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Source: Adapted from Statistisches Bundesamt 2019, pp. 28 f.

5 Conclusion

This study shows that a large proportion of self-employed individuals obtain comparatively small incomes from self-employment. Over the entire observation period from 2001 to 2014, about half of all self-employed individuals achieved incomes from self-employment of less than €5,000 per year. Around one in five self-employed individuals even generates losses. However, not all taxpayers with incomes from self-employment are full-time self-employed and may therefore have other sources of income. In fact, the latter applies to up to 60% of all self-employed individuals. About 44% additionally receive a gross wage from employer-employee relationships. If these additional incomes are considered, the median income rises to over €25,000. Presumably, part of the low incomes from self-employment can be attributed to the fact that these individuals have a side job as self-employed. However, even when additional income is considered, roughly each fourth of all self-employed individuals remain with a total income of less than €10,000. Thus, they are below the basic tax-free allowance or taxable subsistence level, respectively. Most self-employed individuals, however, have a sufficiently high total income to be capable to build up retirement provisions.

Our findings also show that partner incomes must also be considered when assessing the ability to provide for old age of the self-employed. We show that self-employed individuals with small incomes (up to 10,000 €) can often rely on partner incomes, whereas the joint income is only in about 13% of all cases below the joint taxable subsistence level (of 20.000 €). In comparison to individually taxed self-employed individuals, this share is lower because 19% of individually taxed self-employed obtain total incomes below the subsistence level. We also show that income fluctuations over time must be considered. For many self-employed individuals, income below the subsistence level is only achieved during a short episode - they achieve higher incomes shortly afterwards. All in all, the percentage of self-employed individuals who are not able to provide for their retirement phase is suggested to be relatively small.

The investigation of the assets of self-employed persons largely confirms our earlier results. Especially when compared to paid employees, the self-employed own real estate and securities more often and tend to build up larger assets. Solo self-employed individuals have less often business assets and tend to own other assets somewhat less frequently than self-employed individuals with employees. However, it should also be noted that we cannot make any statements

about the phase of the company life cycle and associated incomes from self-employment. In the start-up or post-foundation phase it is not unusual for the self-employed to have neither employees nor business assets. Our results and conclusions therefore also depend on the unobserved age of the self-employed and the life cycle of the companies. We therefore encourage further research on the creation of assets and retirement provisions over time.

Based on our results, we expect that the majority of self-employed individuals have sufficient incomes to build up retirement provisions. Obligations enforcing retirement provisions for self-employed individuals, as mentioned for example in the CDU/CSU/SPD coalition agreement (see CDU/CSU/SPD 2018, p. 93), are thus not imperative. However, we also identify a small group of self-employed individuals with precarious financial situations – also in the long-run. Given their lack of financial resources and the direct link between pension payments and previous income, it seems questionable whether a mandatory pension scheme for self-employed individuals could provide a remedy in these cases.

The associated administrative burden of introducing a mandatory pension scheme for the self-employed is also to be considered. This already starts with the identification of the persons concerned because there is no register of self-employed persons. If the legislator would decide to rely on income tax data, the identification of self-employed persons in secondary employment is problematic due to the considerable number of persons with income from dependent employment as well as from self-employment. It does not seem necessary to extend such an obligation to self-employed individuals in a part-time self-employment. However, in view of the increasing prevalence of hybrid forms of employment, it is hardly possible to make a clear distinction between main occupation on the one hand and secondary income on the other when only relying on information included in tax forms. Besides, the existence of various employment-/occupation-specific social security systems might increase administrative burden in case of changing forms of entrepreneurship and hybrid self-employment.

In addition, the changing financial needs over the life and business cycle must be accounted for. (Young) entrepreneurs need financial resources to invest and grow, especially in the start-up phase. However, the income when starting a business is often low. Compulsory insurance could - especially in this critical phase - hinder necessary investments and thus slow down the growth of these companies. In extreme cases, entrepreneurs may even liquidate their company.

In summary, a retirement provision obligation for self-employed individuals hardly contributes significantly to solving the existing problems. Furthermore, we recommend finding ways to coordinate the currently existing systems in a better way. Substantial reductions in complexity can be achieved in this way – especially for the large number of self-employed individuals with an additional paid employment or the self-employed with unsteady employment histories. Such considerations go beyond the scope of this study. Future research might address these issues in detail.

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Appendix

Table A1: Income from self-employment

| Year | Individuals in thousands. | mean in € | Income from self-employment by percentile | | | | | | | | |
|-------|---------------------------|--------------|---|--------|--------|-----|-------------------------|--------|--------|---------|---------|
| | | | p1 | p5 | p10 | p25 | p50 (median) in € | p75 | p90 | p95 | p99 |
| 2001 | 5,590 | 24,110 | -42,046 | -8,688 | -3,154 | 187 | 5,815 | 25,751 | 62,783 | 104,087 | 261,893 |
| 2002 | 5,765 | 23,122 | -39,535 | -8,801 | -3,314 | 139 | 5,379 | 24,302 | 60,033 | 99,886 | 249,921 |
| 2003 | 5,889 | 22,545 | -35,702 | -8,328 | -3,234 | 105 | 4,944 | 23,267 | 58,369 | 97,326 | 242,439 |
| 2004 | 6,202 | 23,142 | -30,888 | -7,133 | -2,758 | 135 | 4,848 | 22,918 | 58,197 | 98,132 | 250,920 |
| 2005 | 6,350 | 24,618 | -26,564 | -6,234 | -2,345 | 186 | 5,056 | 22,809 | 58,357 | 98,533 | 258,068 |
| 2006 | 6,417 | 25,770 | -21,813 | -5,159 | -1,841 | 274 | 5,334 | 23,841 | 60,592 | 101,514 | 264,953 |
| 2007 | 6,504 | 26,493 | -20,734 | -4,662 | -1,530 | 326 | 5,547 | 24,443 | 62,098 | 104,662 | 273,210 |
| 2008 | 6,524 | 27,046 | -20,803 | -4,589 | -1,492 | 307 | 5,452 | 24,341 | 63,977 | 109,730 | 285,825 |
| 2009 | 6,571 | 24,411 | -21,664 | -4,914 | -1,671 | 228 | 5,013 | 22,784 | 60,071 | 103,179 | 267,677 |
| 2010 | 6,697 | 25,527 | -19,445 | -4,476 | -1,542 | 253 | 4,992 | 22,965 | 60,891 | 104,930 | 275,000 |
| 2011 | 6,840 | 26,263 | -17,074 | -3,859 | -1,300 | 289 | 4,897 | 23,396 | 62,647 | 107,738 | 280,228 |
| 2012 | 6,898 | 26,131 | -15,784 | -3,214 | -963 | 376 | 4,803 | 23,065 | 62,397 | 107,480 | 278,690 |
| 2013 | 6,919 | 26,296 | -14,928 | -2,936 | -851 | 348 | 4,684 | 23,015 | 63,062 | 109,088 | 283,364 |
| 2014 | 6,800 | 27,699 | -14,257 | -2,686 | -713 | 371 | 4,690 | 23,777 | 66,081 | 114,748 | 298,680 |
| Total | | 25,302 | -24,066 | -5,165 | -1,754 | 263 | 5,071 | 23,575 | 61,393 | 104,518 | 270,363 |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

Table A2: Number of self-employed by income classes: Income from self-employment

| year | Individuals with incomes from self-employment from ... to... € | | | | | | | | | Number of observations |
|-------|--|------------|----------------|-----------------|-----------------|-----------------|------------------|-------------------|------------------|------------------------|
| | <0 | 0 - 5,000 | 5,000 - 10,000 | 10,000 - 20,000 | 20,000 - 30,000 | 30,000 - 65,000 | 65,000 - 130,000 | 130,000 - 200,000 | 200,000 and more | |
| 2001 | 1,238,835 | 1,458,059 | 529,107 | 687,445 | 457,086 | 684,906 | 338,702 | 103,943 | 92,234 | 5,590,317 |
| 2002 | 1,313,346 | 1,518,993 | 553,961 | 716,179 | 460,378 | 680,268 | 331,914 | 101,448 | 88,145 | 5,764,632 |
| 2003 | 1,366,776 | 1,585,087 | 567,247 | 724,024 | 458,560 | 673,202 | 328,409 | 100,478 | 85,324 | 5,889,107 |
| 2004 | 1,398,218 | 1,725,899 | 605,595 | 760,953 | 470,633 | 698,452 | 340,645 | 106,546 | 94,605 | 6,201,546 |
| 2005 | 1,368,929 | 1,797,337 | 641,176 | 794,186 | 482,657 | 709,600 | 347,356 | 108,224 | 100,400 | 6,349,865 |
| 2006 | 1,293,522 | 1,841,446 | 651,186 | 810,155 | 492,062 | 740,971 | 368,165 | 114,162 | 105,350 | 6,417,019 |
| 2007 | 1,240,174 | 1,908,738 | 662,326 | 817,993 | 497,340 | 763,289 | 379,561 | 121,389 | 113,288 | 6,504,098 |
| 2008 | 1,255,353 | 1,918,154 | 660,583 | 815,183 | 488,220 | 745,817 | 386,739 | 129,735 | 123,892 | 6,523,676 |
| 2009 | 1,339,667 | 1,943,701 | 665,349 | 816,846 | 485,081 | 721,561 | 365,029 | 120,928 | 113,014 | 6,571,176 |
| 2010 | 1,339,906 | 2,009,846 | 674,502 | 824,813 | 490,717 | 735,893 | 376,539 | 125,377 | 119,603 | 6,697,196 |
| 2011 | 1,324,036 | 2,119,857 | 679,008 | 818,299 | 491,277 | 751,979 | 396,011 | 133,056 | 126,420 | 6,839,943 |
| 2012 | 1,234,130 | 2,251,850 | 688,553 | 821,968 | 491,833 | 752,130 | 397,155 | 134,137 | 126,600 | 6,898,356 |
| 2013 | 1,232,074 | 2,298,915 | 679,438 | 806,980 | 483,384 | 749,800 | 401,333 | 136,644 | 130,710 | 6,919,278 |
| 2014 | 1,158,983 | 2,307,043 | 646,967 | 775,897 | 471,671 | 746,457 | 408,985 | 142,876 | 141,316 | 6,800,195 |
| Total | 18,103,949 | 26,684,925 | 8,904,998 | 10,990,921 | 6,720,899 | 10,154,325 | 5,166,543 | 1,678,943 | 1,560,901 | 89,966,404 |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

Table A3: Descriptive statistics about self-employed with additional sources of income

| Year | Self-employed with additional incomes from... | | | paid employment (gross wages) | | renting and leasing | | capital assets | |
|-------|---|---------------------|----------------|-------------------------------|--------|---------------------|--------|----------------|--------------|
| | paid employment | renting and leasing | capital assets | mean | median | mean | median | mean | Median |
| | in thousands | | | in € | | | | | |
| 2001 | 2,464 | 1,581 | 733 | 44,324 | 33,975 | -3,536 | -1,000 | 18,576 | 2,604 |
| 2002 | 2,524 | 1,602 | 661 | 43,820 | 33,770 | -2,942 | -857 | 10,765 | 2,178 |
| 2003 | 2,537 | 1,625 | 627 | 43,267 | 33,605 | -2,256 | -651 | 9,308 | 2,108 |
| 2004 | 2,605 | 1,664 | 694 | 43,200 | 33,191 | -1,233 | -365 | 9,126 | 1,814 |
| 2005 | 2,626 | 1,670 | 706 | 43,212 | 32,653 | -620 | -172 | 9,729 | 1,823 |
| 2006 | 2,657 | 1,661 | 758 | 43,108 | 32,231 | -189 | -63 | 8,886 | 1,785 |
| 2007 | 2,740 | 1,663 | 1,228 | 42,974 | 31,865 | 344 | 52 | 7,531 | 1,590 |
| 2008 | 2,792 | 1,656 | 1,334 | 42,758 | 31,715 | 760 | 119 | 8,780 | 1,597 |
| 2009 | 2,850 | 1,645 | 312 | 42,098 | 31,572 | 1,441 | 241 | <i>6,297</i> | <i>1,497</i> |
| 2010 | 2,964 | 1,677 | 279 | 42,065 | 31,765 | 1,960 | 368 | <i>6,074</i> | <i>1,308</i> |
| 2011 | 3,119 | 1,720 | 279 | 42,323 | 31,933 | 2,227 | 465 | <i>6,479</i> | <i>1,260</i> |
| 2012 | 3,215 | 1,746 | 273 | 42,489 | 32,277 | 2,633 | 585 | <i>6,356</i> | <i>1,245</i> |
| 2013 | 3,287 | 1,754 | 241 | 42,483 | 32,358 | 3,050 | 717 | <i>6,225</i> | <i>1,245</i> |
| 2014 | 3,308 | 1,747 | 203 | 43,098 | 32,917 | 3,651 | 919 | <i>9,722</i> | <i>1,306</i> |
| Total | 39,688 | 23,410 | 8,330 | 42,903 | 32,532 | 439 | 125 | 9,383 | 1,731 |

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Italic: Under-reporting due to changes in the taxation of capital income.

Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.

Table A4: Number of self-employed by income classes: Total income

| year | Individuals with total incomes from ... to... € | | | | | | | | | Number of observations |
|-------|---|-----------|----------------|-----------------|-----------------|-----------------|------------------|-------------------|------------------|------------------------|
| | <0 | 0 - 5,000 | 5,000 - 10,000 | 10,000 - 20,000 | 20,000 - 30,000 | 30,000 - 65,000 | 65,000 - 130,000 | 130,000 - 200,000 | 200,000 and more | |
| 2001 | 177,498 | 599,466 | 463,414 | 873,831 | 778,410 | 1,572,882 | 633,142 | 155,693 | 137,677 | 5,392,013 |
| 2002 | 204,688 | 647,083 | 493,060 | 916,967 | 794,512 | 1,584,589 | 633,651 | 153,164 | 128,596 | 5,556,310 |
| 2003 | 224,915 | 709,166 | 516,441 | 934,040 | 793,985 | 1,580,401 | 632,587 | 153,601 | 124,834 | 5,669,970 |
| 2004 | 555,346 | 689,759 | 561,172 | 982,551 | 813,677 | 1,632,104 | 662,440 | 163,976 | 140,473 | 6,201,498 |
| 2005 | 533,993 | 719,608 | 599,293 | 1,037,676 | 834,423 | 1,641,634 | 666,109 | 166,692 | 150,378 | 6,349,806 |
| 2006 | 488,257 | 724,875 | 607,858 | 1,053,685 | 845,797 | 1,673,804 | 688,132 | 174,752 | 159,806 | 6,416,966 |
| 2007 | 445,559 | 718,518 | 614,686 | 1,067,151 | 864,536 | 1,718,226 | 713,634 | 187,304 | 174,450 | 6,504,064 |
| 2008 | 420,467 | 710,150 | 617,013 | 1,074,364 | 873,496 | 1,719,353 | 724,026 | 196,800 | 187,944 | 6,523,613 |
| 2009 | 434,447 | 729,470 | 631,830 | 1,105,366 | 900,365 | 1,718,445 | 701,367 | 185,571 | 164,244 | 6,571,105 |
| 2010 | 413,748 | 730,421 | 637,299 | 1,124,578 | 913,571 | 1,779,384 | 732,548 | 192,757 | 172,831 | 6,697,137 |
| 2011 | 376,285 | 724,241 | 640,711 | 1,136,844 | 935,408 | 1,862,094 | 776,769 | 204,560 | 182,949 | 6,839,861 |
| 2012 | 344,330 | 710,887 | 638,771 | 1,142,471 | 945,982 | 1,919,304 | 802,110 | 209,332 | 185,169 | 6,898,356 |
| 2013 | 329,301 | 701,763 | 634,465 | 1,135,018 | 944,275 | 1,949,284 | 821,473 | 213,365 | 190,334 | 6,919,278 |
| 2014 | 296,545 | 647,976 | 591,796 | 1,095,984 | 928,200 | 1,963,912 | 849,785 | 222,682 | 203,315 | 6,800,195 |
| Total | 5,245,379 | 9,763,383 | 8,247,809 | 14,680,526 | 12,166,637 | 24,315,416 | 10,037,773 | 2,580,249 | 2,303,000 | 89,340,172 |

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Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Taxpayer-Panel 2001-2014, own calculations.