# Introducing Minimum Wages in Germany: Employment Effects in a Post Keynesian Perspective

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# Employment Effects in a Post Keynesian Perspective

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**Abstract:**

*There has been a long discussion about the employment impact of minimum wages and this discussion has recently been renewed with the introduction of an economy-wide, binding minimum wage in Germany in 2015. In traditional reasoning, based on the allocational approach of modern labour market economics, it has been suggested that the impact is clearly negative on the assumption of a competitive labour market and clearly positive on the assumption of a monopsonistic labour market. Unfortunately, both predictions conflict with the empirical findings, which do not show a clear-cut impact of significant size in any direction. As an alternative, a Post Keynesian two-sector model including an employment market is presented here. Its most likely prediction of a negligible employment effect and a sectoral shift is tested against the German case of an introduction of a statutory minimum wage in 2015. Despite substantial wage increases in the low wage sector, our empirical analysis reveals very low overall employment loss of about 33,000 labourers as a result of a small sectoral shift from low wage industries to higher wage industries.*

**Keywords:** Post Keynesianism, minimum wage, aggregate demand, aggregate supply

**JEL classification:** B 50, E 12, E 23, J 31

## 1. Introduction

The discussion about minimum wages is an old one[1]. The introduction of a minimum wage in Germany in 2015 added yet another chapter to that discussion[2]. While the economic mainstream view – represented by the majority position within the German Council of Economic Experts (*Sachverständigenrat*) – claimed that there is a negative employment effect, particularly for lower-skilled and young, inexperienced workers (see SVR 2013: 284ff.), progressive or dissenting economists – represented by the minority position within the German Council of Economic Experts – argue that a minimum wage will actually increase the quantity of employment (see SVR 2013: 289f., Bofinger 2014: 164ff.).

Both positions are based on a partial analysis of the labour market using allocational reasoning. Assuming the ordinary labour market to be characterized by perfect competition – as present in a number of introductory textbooks – a minimum wage will undoubtedly have significantly negative employment effects once the minimum wage is higher than the market-clearing wage rate associated with the respective skill level.[3] This is so, because any job that does not earn its labour cost, i.e. where the (minimum) wage rate is higher than the marginal productivity of that job, will eventually be priced out of the market. And a minimum wage that is set below the market-clearing wage rate would clearly be useless. This straightforward result, based on the pre-analytical vision of the labour market being the operator of intertemporal exchange between (real) income, leisure time and postponed consumption, can only be altered without challenging that pre-analytical vision by refuting the assumption of perfect competition. Assuming a monopsonistic labour market, i.e. a labour market with one (dominant) employer, a minimum wage rate set between the profit-maximizing wage rate of the monopsonistic firm and the maximum wage rate associated with the productivity of the same quantity of employment will increase the level of employment and reduce the mark-down on wages (see, e.g., Manning 2003; Ashenfelter/Farber/Ransom 2010).

Both models present clear-cut and opposing predictions about the impact of minimum wage rates on employment and it should, therefore, be easy to evaluate these theories empirically: As there are many countries with long histories of minimum wage legislation (Neumark/Wascher 2008: 9ff., ILO 2014), we should be in a position to falsify either of the two models or, rather, the assumptions on which they rest. Alas, meta-studies on the minimum wage (see, e.g., Doucouliagos/Stanley 2009; Wolfson/Belman 2014) paint a perplexing picture: “Economists have conducted hundreds of studies of the employment impact of the minimum wage. Summarizing those studies is a daunting task, but two recent meta-studies analyzing the research conducted since the early 1990s conclude that the minimum wage has little or no

[1] For an overview, see Neumark/Salas/Wascher (2014).

[2] See e.g. Heitger (2003), Franz (2007), Bauer/Kluve/Schaffner/Schmidt (2009), Paloyo/Schaffner/Schmidt (2013).

[3] Most simulation studies for Germany predicted a loss of more than one million jobs (i.e. about 3% of total employment!) if the current minimum wage of 8,50€ was introduced (see, e.g., Schuster 2013: 33).

discernible effect on the employment prospects of low-wage workers" (Schmitt 2013: 22).

There are two possible ways to tackle the question of why this is the case. (1) Remaining within the traditional pre-analytic vision (i.e. accepting the ontological dimensions of the neoclassical paradigm), one has to find "channels of adjustment" that could stop managers from firing workers as would be expected by the ordinary competitive market model (see Hirsch/Kaufman/Zelenska 2011: 1; Schmitt 2013: 11ff.): increasing productivity via training or lower labour-turnover or reducing the effect of nominal minimum wages on real minimum wages by allowing the cost to be passed on in the form of price increases. Of course, one could also assume that real world labour markets may be partly competitive (in some regions) and partly monopsonistic (in other regions): Depending on the employment shares of both market structures, this would cancel out positive and negative employment effects. (2) If one turns to a different pre-analytical vision – which would mean a truly heterodox approach[4] – then a different prediction about the impact of minimum wages on employment becomes possible: one which is better in line with the empirical picture.

This is exactly what the present paper attempts to provide. Taking the empirical evidence as a strong disincentive to accepting the traditional reasoning, we will provide a model of a Post Keynesian 'employment market' that not only suggests a macroeconomic frame, but is based on a pre-analytic vision of the economy as a system of nominal obligations (part 2).[5] This general model needs to be restructured in such a way as to portray the effect of minimum wages on employment. As the effect of minimum wages is to hamper wage dispersion, or even to shrink the lower bound thereof, in order to avoid 'unfair' wages (or, morally speaking, 'exploitation') for that part of the labour force that is no longer covered by collective agreements (see Bachmann et al. 2008: 28ff.), we can rely on a two-sector model created to discuss the employment effects of growing wage dispersion (part 3). Finally, in part 4 we take a look at the effects of the introdcution of a statutory minimum wage on employment in Germany in 2015 using availabe data on household consumption elasticities and sectoral affectedness by the minimum wage introduction.

## 2. A Post Keynesian Model of the Employment Market

Post Keynesianism is a portmanteau term for a variety of quite different heterodox approaches. By relying closely on the ideas presented in chapter 2 of Keynes' *magnum opus*, fundamentalist or monetary Keynesianism appears to have elaborated the most highly-visible approach to providing an alternative to the ordinary labour market of the neoclassical mainstream (see e.g. Weintraub 1957, Davidson/Smolensky 1964,

[4] For a theoretical deduction of heterodox economics, see Heise/Thieme (2016: 1107ff.).

[5] To my knowledge, there are only three Post Keynesian studies on minimum wages, of which one is not in English (Seccareccia 1991) and the other two rather broad in nature (Herr/Kazandziska/Mahnkopf-Praprotnik 2009; Herr/Kazandziska 2011).

Davidson 1994, Kregel 1984/85).[6] Monetary Keynesianism does not only forcefully reject Walras' law as (positive or negative) heuristic (see Heise 2017a), it also provides a microeconomically-based, yet macroeconomically-embedded employment determination that turns the quantity-price nexus of neoclassical labour markets upside down. It is not the real wage rate that causally governs labour supply and demand until equilibrium is reached at the full employment level; but rather the quantity of labour demanded and supplied (at the level where real wage and profit expectations are fulfilled and, therefore, a stable position beyond the market-clearing point is reached) is determined endogenously and simultaneously with the real wage rate.[7] The employment market[8], as will be developed below, cannot, therefore, be considered by way of a partial analysis, independently of its macro-economic environment. We will, thus, have first to outline a Post Keynesian macro model, before we concentrate – but always keeping the macro-economic links in mind – on the employment market.

The stylised Post Keynesian model presented here is an elaboration of Setterfield (2006), Heise (2008) and Pusch/Heise (2010). It comprises 10 structural, behavioural and definitional equations. The structural equations depict the Post Keynesian core of the model. The behavioural equations refer to empirically-based descriptions of behaviour of macroeconomic actors (e.g. the policy of the Central Bank) that might be subject to change and, in any case, do not affect the paradigmatic core. We start with the demand equation:

$$D_t = \alpha(\bar{w}, I_t, \overline{m}, \overline{G}, L_t), \qquad (1)$$

where $D$ is the value of aggregate demand, which evolves as a function of (given) nominal wages $\bar{w}$, nominal private investment outlays $I$, the (given) investment multiplier $\overline{m}$, (given) governmental spending $\overline{G}$, and labour employed $L$.

The supply relation is:

[6] Of course, ever since Franco Modigliani's extension of Hicks' ISLM interpretation of Keynes' *General Theory* (see Modigliani 1944), the labour market and employment determinantion have played a significant role in those economic approaches that are termed 'Keynesian'. However, to my knowledge, other than monetary Keynesianism, there is no other Post Keynesian approach that attempts explicitly to reject traditional labour market reasoning and to take seriously Keynes' claim that the real wage is no exogenous control or distributive device, but is endogenously determined *pari passu* with the quantity of employment. Therefore, Lavoie's approach (Lavoie 2014: 280ff.) is not followed here which – based on the conception of market rationing – rejects the idea of a 'well-behaved' uniquely negative employment-real wage relation with respect to effective as opposed to notional demand configurations. His intention is to introduce functional (not personal!) income distribution into employment determination but not to reject traditional real wage modelling altogether.

[7] „[…], and the volume of employment is uniquely related to a given level of real wages – not the other way round" (Keynes 1936: 30).

[8] Throughout this paper, we will call the virtual place of employment determination from a Post Keynesian perspective the 'employment market', in order to distinguish it from the ordinary 'labour market' of neoclassical provenance.

$$Z_t = \beta(\bar{w}, \overline{T}, L_t). \tag{2}$$

$Z$ is the value of aggregate supply. $\overline{T}$ denotes (given) technology. The next equation is an equilibrium condition:

$$D_t \equiv Z_t. \tag{3}$$

The price level *p* depends on the nominal (given) wage rate $\bar{w}$, given technology and a given mark-up $\bar{\pi}$:

$$p_t = \gamma(\bar{w}, \overline{T}, \bar{\pi}). \tag{4}$$

The model also includes an equation for the output gap:

$$Y_t^{gap} = Y_t - Y_{Trend}, \tag{5}$$

where $Y$ is real income and $Y_{Trend}$ is (given) trend income. Real income

$$Y_t = \theta(\overline{K}, L_t, \overline{T}) \tag{6}$$

is dependent on production factors and technology. $L$ is the level of employment determined by eq. (3), $K$ is the (given) stock of real capital. The next equation describes nominal private investment outlays:

$$I_t = \lambda(i_t, \overline{E}) \tag{7}$$

which depend on a (given) schedule of expected profit rates $\overline{E}$ and the long-term interest rate $i$. The latter is determined by the following equation:

$$i_t = \mu(i_t^{CB}, \overline{L}P). \tag{8}$$

Here the Central Bank's instrument variable $i_t^{CB}$ comes into play, as does the (given) schedule of liquidity preferences $\overline{L}P$.

Lastly, we provide a behavioural equation for the CB's interest rate:

$$i_t^{CB} = \phi(p_t^{gap}, Y_t^{gap}) \tag{9}$$

which depends on the price gap $p^{gap}$ and the output gap. The price gap is defined by

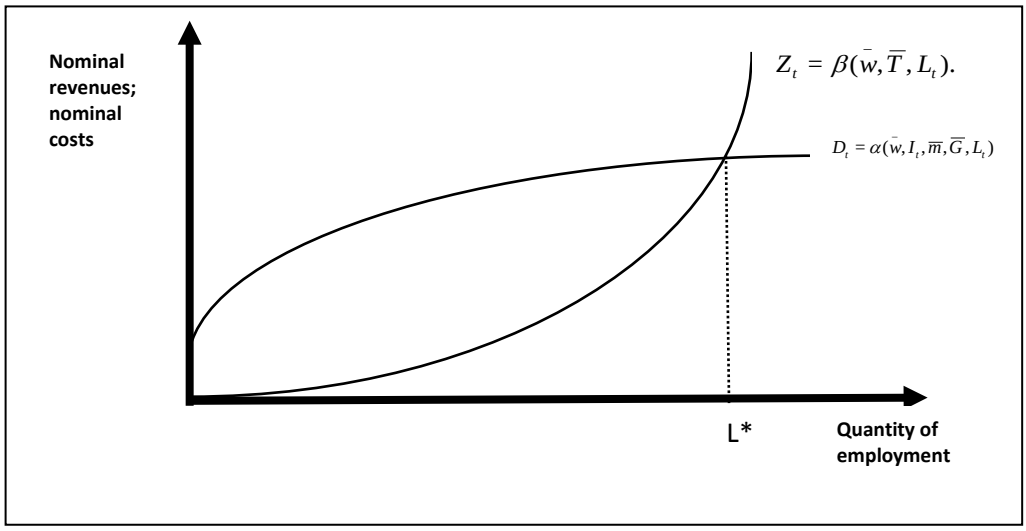
$$p_t^{gap} = p_t - p^*, \tag{10}$$

where *p* stands for the actual price level and $p^*$ is the (given) targeted price level.[9]

The model comprises an aggregate demand-aggregate supply section (eq. 1–3) determining the equilibrium employment level, an ordinary production function (eq. 6), mark-up pricing (eq. 4), a (Taylor-rule) monetary reaction function (eq. 9–10 and 5) portraying the money and credit market and endogenously (and only implictly) determining the quantity of money, and a Keynesian investment function (eq. 7). The model is distinctly Post Keynesian in nature inasmuch as: the employment level depends on the propensity to consume, the incentive to invest, the nature of long-term expectations, and liquidity preference considerations (see Keynes (1936: 250); money is endogenously created; and nominal investment outlays ("finance") generate the nominal obligations on which a monetary economy is based.

The Post Keynesian employment market is depicted by the aggregate demand – aggregate supply section (eq. 1 – 3) and has first been elaborated by the late Sidney Weintraub (1957). As shown in fig. 1, overall employment is determined by the intersection of the aggregate demand curve D and the aggregate supply curve Z. The D-curve is the aggregation of firms' expectations about nominal revenues taking the nominal wage rate as given. The Z-curve is the aggregation of firms' nominal costs associated with a certain level of employment, the given nominal wage rate, technology, and fixed capital stock. The resultant quantity of employment in the overall economy is thus the number of jobs made available by employers under profit maximization principles in a world of fundamental uncertainty.

**Fig. 1: Employment determination in a Z-D-model**




Whether L* equals the quantity of employment supplied by households at the ruling wage rate, surpasses it or falls short of it, cannot be predicted with accuracy – in economic history, we have experienced all three constellations.[10] What can be said with

[9] Typically, eq. (4) and eq. (10) are expressed in terms of rates of change (i.e. inflation rates and rates of change of wages). For the sake of simplicity, levels (i.e. price levels and wage rates) are used here.

[10] Post-war (West) German economic history, for instance, showed a period of , excess employment' up

some certainty is that a mature economy with a large capital stock (i.e. low marginal efficiency of capital), high income and saturation level (i.e. low marginal propensity to consume), and high labour market participation rates for both men and women will be far less likely to secure full employment than an economy with lower capital stock (i.e. higher marginal efficiency of capital), lower income and saturation levels (i.e. higher marginal propensity to consume), and lower labour market participation rates. What can also be said is that any disequilibrium between supply and demand of employment cannot easily be cured by curtailing wage aspirations (see e.g. Davidson 1994: 179ff.), as the nominal wage rate (which is the appropriate controlable variable) enters equally into both aggregate demand and supply functions – graphically acting as a shift parameter that leaves the intersection of the curves unaltered with respect to the quantity of employment[11]. Therefore, Keynes and Post Keynesians favour(ed) a wage regime that is able to introduce some downward rigidity as an institutional device for safeguarding the stability of the economic system.[12]

It is necessary to point out at this stage that a labour market in which supply and demand for labour is equilibrated by real wage movements does not exist in any operative way (see, e.g., Lucas 1981: 242; Darity/Horn 1988: 220; Heise 2017a). Real wages can neither be determined exogenously by the parties to collective bargaining nor by individual actors, but will be determined in line with employment and the price-level once the nominal wage rate is set and the production technology is given. Taking the common features of a 'well-behaved' production function for granted[13] (eq. 6), higher employment is *ceteris paribus* associated with a lower real wage rate. But this correlation cannot be turned into a causality running from lower real wages to higher employment.

## 3. A Sectoral Refinement

In order to discuss the effect of minimum wages on employment, we need to portray a two-sector model of the Post Keynesian employment market (see Heise 1998; Heise

until the early 1970s (when migrant labour was invited into Germany to close the gap), ‚full employment' until the first oil crisis in the mid-1970s and unemployment ever since.

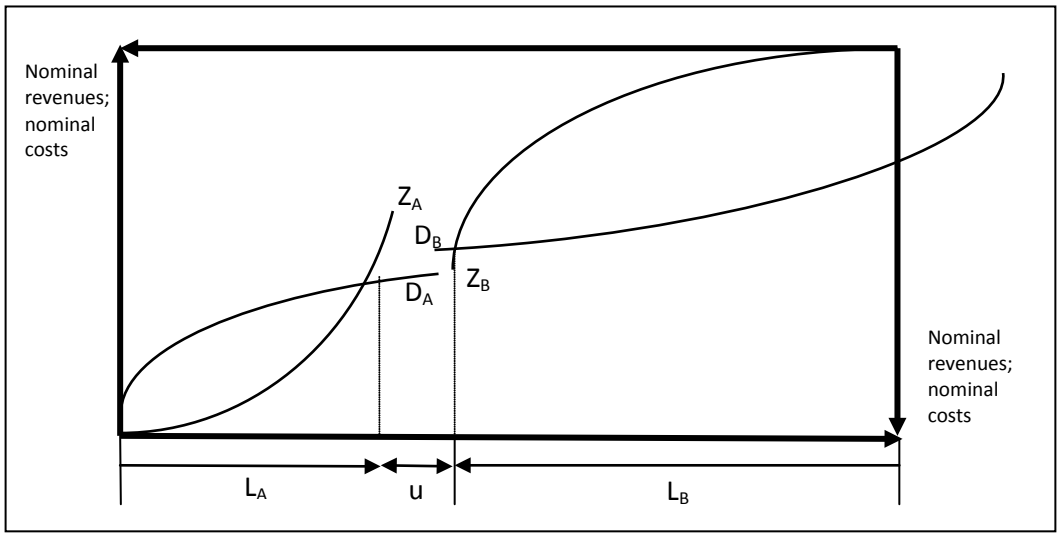
[11] This result rests on two assumptions: (1) a closed economy; and (2) endogenous money. Of course, the assumption of a closed economy is not very realistic. But the introduction of external economic relations does not necessarily produce a different result (this depends on the exchange rate system) or would imply a beggar-thy-neighbour strategy. The second assumption is, of course, a basic Post Keynesian assumption, which undermines the likelihood of positive real-balance effects in favour of negative real-balance effects in case of a severe deflationary process.

[12] "In the light of these considerations I am now of the opinion that the maintenance of a stable general level of money-wages is, on the balance of considerations, the most advisable policy for a closed system; …" (Keynes 1936: 270).

[13] This, of course, may be seen critically by Sraffians. However, it conforms to Keynes' acceptance of the ‚first fundamental postulate' in the *General Theory* (Keynes 1936: 5ff.). Moreover, we interprete Sraffa's critique not as a complete refutation of a ‚well-behaved' production function but as the theoretical proof that the particular properties of a ‚well-behaved' aggregate production function (i.e. the falling marginal productivities of the factors of production) may not hold in any case. However, the empirical validity of this theoretical possibility is still open to discussion; see e.g. Hamermesh 1986, Felipe/McCombie 2005.

1999): sector A comprises all firms that are affected by the minimum wage and sector B comprises all firms that pay wages above the minimum wage level (see fig. 2)[14].

**Figure 2: A Post Keynesian 2-sector-model of the employment market**




$L_A$ and $L_B$ denote the quantities of employment in sector A and B respectively[15]; u depicts unemployment. What we are interested in is the impact of an increase in the nominal wage rate in sector A up to the level of a fixed minimum wage rate, while the wage rate in sector B stays unchanged. As elaborated in Heise (1998: 254ff.), the sectoral employment effect of a change in the sectoral wage rate depends on the relative weight of the 'substitution effect' of relative price changes of commodities (i.e. the respective sectoral price elasticities of demand) and the 'income effect' of (wage) income changes (i.e. the respective income elasticities of demand). The overall employment effect can be summarized as follows[16]:

$$N^\circ = k\,(\eta_{A,A} + \eta_{B,A} - \varepsilon_A - 1)\,w_A^\circ + (1-k)\,(\eta_{B,B} + \eta_{A,B} - \varepsilon_B - 1)\,w_B^\circ \qquad (11)$$

*($\varepsilon_i$ = absolute value of the own price-elasticity of demand for commodities of sector i; $\eta_{i,j}$ = income-elasticity of demand of wage earners of sector j for commodities of sector I;k = employment share of sector A; ° denotes the rate of growth [percentage change] of a variable)*

[14] Of course, sector A will comprise firms from many different industrial sectors and branches. In Germany, most firms with most of the employees that will be affected by the minimum wage legislation are from branches such as agriculture, forestry and fishing, retail, transportation, food and beverages, and hotels and restaurants (see Bellmann et al. 2015).

[15] In different studies (see Knabe/Schöb/Thum 2014; Brenke/Müller 2013; Falck et al 2013; Heumer/Lesch/Schröder 2013; Kalina/Weinkopf 2013), the percentage of employees affected by the minimum wage in Germany, i.e. $L_A$, ranges between 14% - 20% of total employment.

[16] Specifying eq. 1 and eq. 2 and assuming, for the sake of simplicity, that only wage earners consume and no governmental spending, we get: $Z_i = (\pi_i/\omega_i)\, w_i\, N_i$ and $D_i = c_{i,i}\, w_i\, N_i + c_{i,j}\, w_j\, N_j + I_i$ with $\pi_i$ = average labour productivity in sector i and $\omega_i$ = marginal labour productivity in sector i; $w_i$ = nominal wage rate in sector i and $N_i$ = empoyment in sector i; $c_{i,j}$ = marginal propensity to consume commodities from sector j of wage earners from sector i and $I_i$ = (autonomous) investment spending on commodities of sector i. Now, the rate of change of employment with respect the rate of change of the nominal wage rate depends on the relative rate of change of the D- and Z-functions: $N_i^\circ \mid w_i^\circ = c_{i,i}^\circ\, N_i^\circ - (\pi_i^\circ - \omega_i^\circ)$. Defining $c_{i,i}^\circ = \eta_{i,i}$ ; $\pi_i^\circ - \omega_i^\circ = \varepsilon_i$ and k = share of employment in sector i (and, respectively, (1-k) as employment share of sector j), we get: $N^\circ = k\,(\eta_{i,i} + \eta_{j,i} - \varepsilon_i - 1)\, w_i^\circ + (1-k)\,(-\eta_{j,j} - \eta_{i,j} + \varepsilon_j - 1)\, w_j^\circ$.

Assuming the absence of 'money illusion', an increase of nominal wages in both sectors at the same rate will cause prices to increase accordingly (eq. 4) and – relative prices being unaltered – the quantity of employment will not be affected: i.e. $N° = 0$ as long as the price increase does not trigger a contractionary monetary reaction by the central bank (eq. 10).

But what is the outcome if wages increase in one sector only? Let us assume the introduction of a fixed, binding minimum wage for all branches, resulting in an increase of the nominal wage rate in sector A by x%, while the nominal wage rate in sector B stays unchanged:

$$w_A° = x$$

$$w_B° = 0$$

Disregarding cross-price elasticities of demand and any possible reaction from the central bank, the employment effect will be[17]:

$$N_A° = k\,(\eta_{A,A} - \varepsilon_A - 1)\,w_A° + (1 - k)\,\eta_{A,B}\,w_B° \qquad (12)$$

$$\rightarrow \quad N_A° \mid w_A° = k\,(\eta_{A,A} - \varepsilon_A - 1)\,x \qquad (12a)$$

$$N_B° = (1 - k)\,(\eta_{B,B} - \varepsilon_B - 1)\,w_B° + k\,\eta_{B,A}\,w_A° \qquad (13)$$

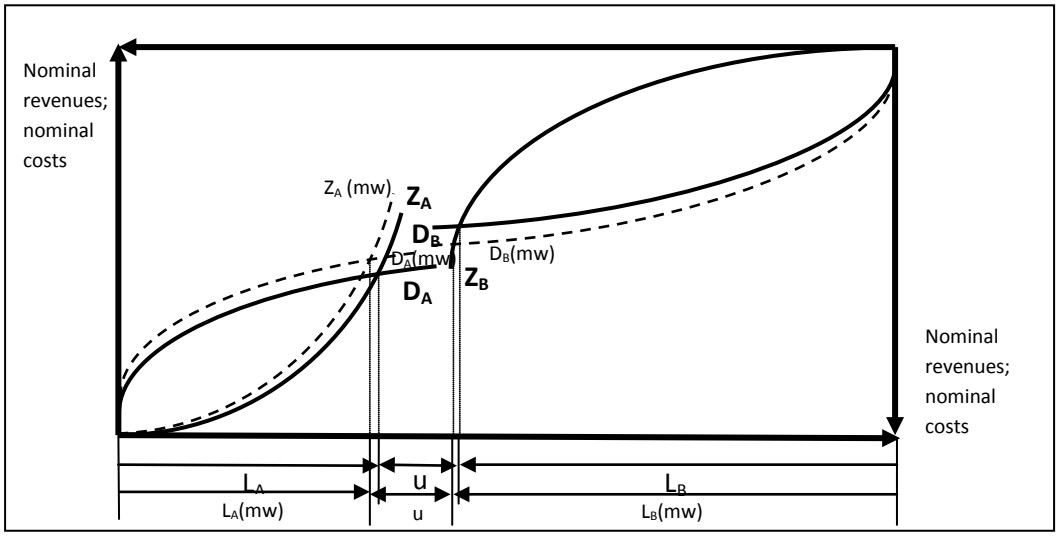
$$\rightarrow \quad N_B° \mid w_A° = k\,\eta_{B,A}\,x \qquad (13a)$$

$$N° \mid w_A° = k\,(\eta_{A,A} + \eta_{B,A} - \varepsilon_A - 1)\,x \qquad (14)$$

The 'substitution effect' is given by the magnitude of the price-elasticity of demand for those commodities produced by workers affected by the minimum wage legislation, $\varepsilon_A$; the 'income effect' is determined by the income elasticities of demand of those workers affected by the minimum wage for commodities from sector A, $\eta_{A,A}$, and for commodities from sector B, $\eta_{B,A}$ (see eq. 14). From eq. 12a and eq. 13a, the respective sectoral impacts of the introduction of a minimum wage in sector A can be specified. Obviously, they will be of different magnitude and they might also be of different sign: While sector B might gain from minimum wages in sector A (income effect), sector A itself will have to weigh the positive income effect against the negative substitution effect. Most likely, the employment impact in sector B will be positive, while it will be negative in sector A (see Fig. 3).

[17] Herr/Kazandziska/Mahnkopf-Praprotnik (2009: 12) come to the following conclusion with respect to employment effects of minimum wages in a Post Keynesian approach: „…minimum wages will change the structure of wages, the structure of prices, the structure of demand for final products and the structure of demand for inputs. How employment is affected is theoretically open and extremely difficult to predict empirically." If 'theoretically open' is to mean that there may be different Post Keynesian model specifications with potentially different results, the statement is correct but also somewhat trivial. And whether the effects are 'extremely difficult to predict' depends on the specific model specification – formal specifications as opposed to narrative approaches, at least, offer the charme to make prediction rather easy. Whether such predictions can easily be falsified empirically, is yet another question and depends on the testability of the theoretical predictors. But, maybe, that is what they meant by 'extremely difficult to predict empirically'.

**Figure 3: A Post Keynesian employment market with minimum wage**




Note: mw denotes the respective function or variable after the introduction of a minimum wage

## 4. An application: a quantitative analysis for Germany

From chapter 19 of the *General Theory*, we can infer that Keynes was rather skeptical about the positive effect of wage reductions on employment outcomes. Contrary to neoclassical labour market theory[18], Keynes argued that both moderate wage reductions and moderate wage increases, which result in neither massive deflationary nor massive inflationary pressure, will affect the price level, but not the total quantity of employment (see Keynes 1936: 267). It is only once wage changes trigger a contractionary monetary reaction or markedly increase the real burden of nominal obligations that negative employment effects are likely to occur.

Keynes, however, assumed a single nominal wage rate for all firms (by transforming different types of labour into 'ordinary labour') and thus concentrated on change in the general wage level, while ignoring the possible effects of a change in the wage structure. In order to shift our attention to precisely this object of inquiry, we had to refine the simple Post Keynesian employment market model by introducing two different sectors, A and B, in which the nominal wage rates $w_A$ and $w_B$ differ and may change in different ways. As we have seen, the sectoral, as well as total, employment effect of a change in the wage structure due to the introduction of a general, binding minimum wage depends on the respective magnitudes of the income- and price-elasticities of demand.

[18] Pigou's *Theory of Unemployment* (Pigou 1933) which Keynes explicitly critisized in his *General Theory*, can still be seen as the foundation of modern labour market theory.

### 4.1 Description of sectors

In order to predict the effect of a minimum wage in sector A, we have to estimate the respective elasticities of demand for those commodities affected by the introduction of a minimum wage and the income-elasticities of demand of the wage-earners of sector A. This, alas, poses serious problems. In the real world, there is no such sector in which all firms are affected by the minimum wage as there is no alternative sector in which no firm is affected by the minimum wage. Instead, we will have to group firms (or, rather, industries) by their share of employees being affected by the minimum wage. Our example is the case of Germany, where a statutory minimum wage of 8.50 € was introduced from 1st of January 2015 onwards.

In order to measure industries' affectedness by the minimum wage introduction, we used the GSOEP (German Socio Economic Panel) and its two-digit industry classification (Nace classifications 1..99). GSOEP supplied by DIW is a yearly survey among about 30,000 German residents. It comprises industry and worker information that can be used for the calculation of hourly wages for about 10,500 workers. We did not consider workers with legal exemptions from the statutory minimum wage – such as interns, former long term unemployed in their first half year of employment, pupils below 18 years and apprentices. However, we did consider industries with a temporary exemption from the minimum wage as their collectively agreed minimum wages were on track to be replaced by the statutory minimum wage by 2018. We also kept industries with higher binding minimum wages (extended by law, e.g. in mainstream construction), as the minimum wage should in principle lead to higher enforcement of legislated wages also in these industries.[19]

For the calculation of the hourly wage we used the monthly gross wage, agreed hours, payed overtime as well as collective agreement information (25% overtime premia are customary when there is a collective agreement). An overview of those industries and their relative minimum wage affectedness is given in tab. 1.

Tab. 1: Industries comprising sector A and sector B

| Industries | Share of minimum wage earners | Average wage increase |
|---|---|---|
| **Sector A** | **28.6%** | **+4.6%** |
| **Crop and animal production, hunting and related service activities** | 23.6% | |
| **Fishing and aquaculture** | 36.8% | |
| **Manufacturing of food products** | 23.9% | |
| **Manufacturing of tobacco products** | 89.1% | |
| **Manufacturing of textiles** | 15.8% | |

[19] So far, enforcement in these industries is fairly low with about 27% (sectoral) minimum wage violations, as has been shown by Pusch (2018).

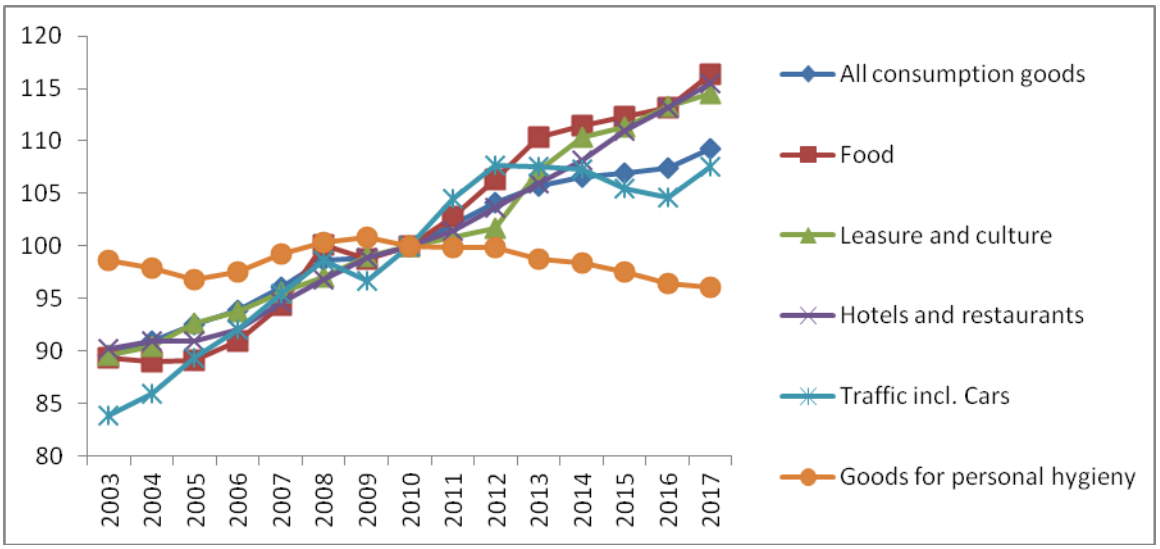
| | | |
|---|---|---|
| **Manufacture of wearing apparel** | 23.8% | |
| **Manufacturing of leather and related products** | 66.1% | |
| **Manufacture of furniture** | 13.8% | |
| **Wholesale trade, except of motor vehicles and motorcycles** | 25.3% | |
| **Accommodation** | 46.1% | |
| **Water transport** | 33.2% | |
| **Rental and leasing activities** | 33.1% | |
| **Sports activities and amusement and recreation activities** | 16.5% | |
| **Other personal service activities** | 47.2% | |
| **Activities of households as employers of domestic personnel** | 48.5% | |
| **Sector B** | **6.1%** | **+0.6%** |
| **Forestry and logging** | 1.2% | |
| **Manufacturing of wood and of products of wood and cork, except furniture; Manufacturing of articles of straw and plaiting materials** | 3.0% | |
| **Manufacturing of paper and paper products** | 2.7% | |
| **Printing and reproduction of recorded media** | 7.7% | |
| **Manufacturing of chemicals and chemical products** | 1.4% | |
| **Manufacturing of rubber and plastic products** | 6.4% | |
| **Manufacturing of other non-metallic mineral products** | 9.8% | |
| **Manufacturing of basic metals** | 1.8% | |
| **Manufacturing of fabricated metal products, except machinery and equipment** | 4.3% | |
| **Manufacturing of computer, electronic and optical products** | 0.0% | |
| **Manufacturing of electrical equipment** | 2.7% | |
| **Manufacturing of motor vehicles, trailers and semi-trailers** | 5.0% | |
| **Manufacturing of other transport equipment** | 7.6% | |
| **Wholesale trade, except of motor vehicles and motorcycles** | 8.9% | |
| **Land transport and transport via pipelines** | 9.7% | |
| **Air transport** | 9.5% | |
| **Telecommunications and postal services** | 12.0% | |

Source: GSOEP v33.1, 2014 cross section, own calculations.

Sector A of tab. 1 comprises all such industries with an above-average (>=13%) share of workers earning less than 8.50 € per hour before the minimum wage introduction, while sector B comprises all such industries with a below-average share of those workers (<13%). Using this categorisation, we had to leave out a considerable number of industries covering about 50% of all employees because they neither produce for final demand (e.g. intermediate inputs) nor are their markets price-coordinated (such as most governmental services in the widest sense) in which cases the foregoing analysis does not apply. In some cases we decided to retain input-producing industries as it seemed reasonable that their output is mainly delivered to industries producing final demand goods of the same sector A/B (e.g. low wage agriculture delivers inputs to low wage industry manufacturing of foods). As reported in tab. 1, on average 28.6% of the employees in sector A were affected by minimum wages, whereas only 6.1% of the

employees in sector B were affetced. As a result, the average nominal wage increase in sector A due to the introdcution of the minimum wage in 2015 was 4.6%, while it was only 0.6% in sector B.

**Figure 4: Selected good price indices (2010 = 100%)**




Source: Tabelle 61111-0003, German Federal Statistical Office

The introduction of a minimum wage distorts the wage structure at the lower end, increasing nominal, real and relative wages for the least paid labourers. This, again, distorts relative costs and prices of goods according to their exposure to minimum wage labour. Relative price developments in typical low wage industries as food production (using many inputs from agriculture which is also characterized by low wages), leisure and culture as well as hotels and restaurants developed dynamically after the minimum wage introduction (in leisure and culture already before 2015, see figure 4) while this is not the case for goods/services the largest spending categories from sector B (traffic including cars and goods for personal hygiene). The resulting effect on overall and sectoral output and employment depends ultimately on the allocation of effective demand across the sectors. Changes in effective demand – due to changes in wages and the wage structure – will cause output and employment changes as well as a change in the sectoral allocation of effective demand. The scale and direction (positive or negative) of such changes and the outcome with respect to output and employment depend on the magnitude of the demand elasticities involved.

Therefore, no universally valid quantitative prediction of the employment effects can be made. However, there is good reason to believe that the most likely effect of a general, binding minimum wage on overall employment is negligible or at least very small (see Heise 2017a). In order to make a more precise quantitative estimation for the German case (and to test this general prediction), we estimated price and income elasticities using the EVS (*Einkommens- und Verbrauchsstichprobe*) dataset and consumption price deflator sub-categories, both supplied by the German Federal Statistical Office (*Statistisches Bundesamt*). The EVS contains rich household information about

categories of consumer spending, income, sociodemographic information as well as the industry of occupation of the main earner in the years 2003 and 2013. For the estimations only households with workers from sectors A and B were considered. Real consumption of goods from sector A and B and two combined goods price indices were calculated (base year 2010). Income and price elasticities were then estimated with log-normal equations including logs of real spending for goods of sectors A/B, real household income and the relative price indices.

Tab. 2: Price and income elasticities for Germany

| Elasticities | Magnitude |
|---|---|
| **$\eta_{A,A}$; Income elasticity of demand of workers from sector A for goods from sector A** | 0.62 |
| **$\eta_{A,B}$; Income elasticity of demand of workers from sector B for goods from sector A** | 0.56 |
| **$\eta_{B,A}$; Income elasticity of demand of workers from sector A for goods from sector B** | 0.77 |
| **$\eta_{B,B}$; Income elasticity of demand of workers from sector B for goods from sector B** | 0.72 |
| | |
| **$\varepsilon_A$; Price elasticity of demand for goods from sector A** | -0.58 |
| **$\varepsilon_B$; Price elasticity of demand for goods from sector B** | -1.81 |

Source: EVS and consumption price deflators (German Federal Statistical Office), own calculations.

Tab. 2 reports the results: Income elasticities of demand for goods from sector A are lower than those for goods from sector B, indicating that sector A provides goods for more basic needs than sector B (including a high share of food expenditure). Moreover, demand for goods from sector B is markedly price-elastic while demand for goods from sector A is price-inelastic. This finding corresponds with the above characterization of goods from sector A as being more basic than those from sector B.

### 4.2 Estimation of employment effects

As the result of a statutory minimum wage introduction, both sectors face an increase in nominal wage cost and final demand. Due to the higher exposure of sector A to minimum wage earners, prices will increase relatively more in sector A than in sector B. Due to the lower income-elasticity of demand for goods from sector A than for sector B, it is to be expected that the positive “income effect” of an introduction of minimum wages in Germany on sector A will be outweighed by a negative “substitution effect” of absolutely and relatively rising prices – i.e. a loss in employment appears likely. In the case of sector B, the relation of both effects is less clearly to be predicted – the expected employment effect may bear both signs.

Tab. 3: Employment effect of minimum wage in Germany

| Sector | Employment share in % | Employment effect | Employment effect in % of total employment |
|---|---|---|---|
| **Sector A** | 21.4 | -57,400 | -0.9% (of sector A) |
| **Sector B** | 21.2 | +32,000 | +0.5% (of sector B) |
| **Total** | 42.6 | - 25,400 | -0.1% (of total employment) |

Source: GSOEP, EVS, CPI sub-categories (German Federal Statistical Office), own calculations.

As reported in tab. 3, relying on the empirical elasticities for the two sectors for Germany, sector A will have experienced an employment loss of about 57,400 jobs or -0.9% of its employment level prior to the minimum wage introduction. However, sector B faces a gain in employment of about 32,000 jobs or +0.5% of total employment in this sector. This means that the introduction of a general, binding minimum wage of 8.50 € in 2015 has caused an overall drop in employment of about -25,400 jobs or -0.1% of total employment and a structural shift from sector A to sector B. These incremental changes are entirely in line with the results from the above-mentioned meta-studies on minimum wages showing indiscernable effects on employment.

However, some qualifications are in order: the study is concerned with only 43% of total employment. With respect to the determination of employment in governmental services, the implicit assumption may hold, that minimum wages are of no concern here. This is less obvious in the case of the semi-public health care sector and employment in the provision of intermediate goods. Yet, in order to include employment in intermediate goods production, the model would have to be extended by some kind of input-output analysis – something which must be left for further modelling.

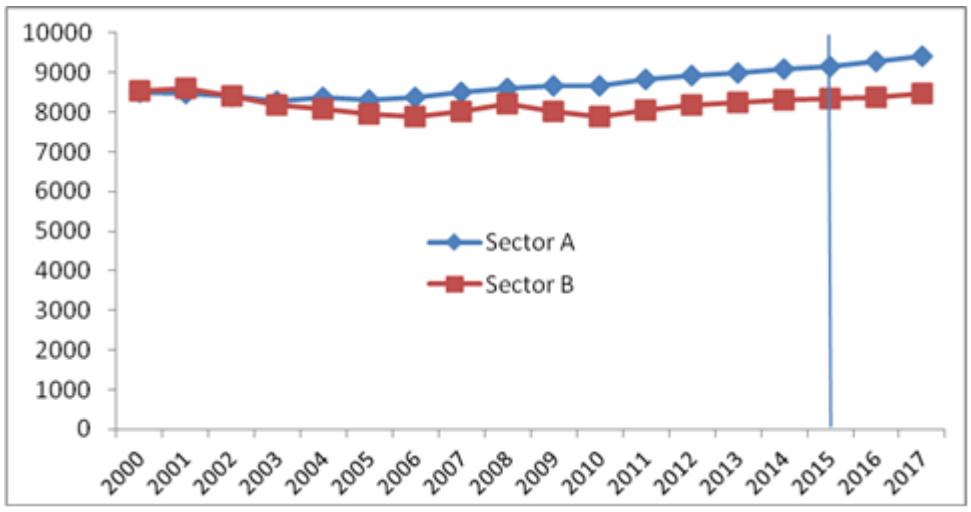
Our simulation also does not take into accout possible changes in the demand for investment goods, which could result from higher wage growth as has been argued by Görzig (1998) in a capital vintage framework. Such effects could reinforce employment gains in sector B. Moreover, the consideration of cross-price elasticities may enhance the shift of inter-sectoral jobs. What could make our results a bit too pessimistic regarding the net number of lost jobs is that we could just calculate marginal consumption elasticities for all workers of sectors A/B (not just minimum wage earners), as the calculation of hourly wages in EVS is currently not possible. Therefore, income elasticities of tab. 3 can rather be seen as the lower bound of actual income elasticities. Higher income elasticities would make real job losses in sector A even smaller whereas employment gains in sector B would increase further. And, finally, the magnitude of jobs losses can also be smaller in reality than estimated here because of the large amount of firms that do not comply with the minimum wage legislation (in 2016 there have been violations of the minimum wage for about 8% of eligible employees or 2.2 million workers, see Pusch 2018).

## 5. Conclusion

As shown in Tab. 3, the impact of the introduction of an economy-wide, binding minimum wage on overall employment in a Post Keynesian perspective is most likely to be negligible or at least very small, provided no contractionary monetary reaction is triggered and the parameter constellation is as in the German case. The picture may, however, look different if single industries or sectors are taken separately. This result is very much in line with the empirical findings of the above-mentioned meta-studies and appears to fit reality with respect to deviant industry results (see e.g. Machin/Manning/Rahman 2003, König/Möller 2007) and first, preliminary empirical findings for the recent German case (see e.g. Bossler/Gerner 2016 who estimated 60.000 lost jobs due to the minimum wage introduction[20]). It also fits empirics better than either the neoclassical labour market model of perfect competition or of monopsony.

Moreover, the employment trends of both sectors A and B do not show any apparent structural break after 2014 (see fig. 5) which may be attributed to the introduction of the statutory minimum wage – yet another piece of empirical evidence which resonates on the Post Keynesian predictions of fairly low job losses/gains in sector A and B.[21]

**Figure 5: Trends of dependent employment in sector A and B (1000); 2000 - 2017**




Source: Fachserie 18, Reihe 1.1, Federal Statistical Office Germany, own calculations.

[20] Although this number is reasonably close to our simulation and much nearer to the above-mentioned forecasts of job losses in the range of 1 million and more, it should be noted that the DiD design of Bossler and Gerner rather refers to gross job losses in our sector A. Moreover work time effects were not taken into account. Simultaneous to the minimum wage introduction there has been a substantial conversion of low working time minijobs into longer working time employment subject to social insurance (albeit mainly part time) as recent results have shown (vom Berge et al. 2017).

[21] Sectors A and B here deviate slightly from the compilation of section 4. The reason is data availability in most recent statistics of the German Federal Statistical Office. Sector A of Fig. 4 comprises agriculture, hotels, restaurants and transportation. Sector B here comprises manufacturing and telecommunication/ postal services.

**Bibliography**

Ashenfelter, O.C., Farber, H., Ransom, M.R. (2010): Labor Market Monopsony, in: *Journal of Labor Economics*, Vol. 28, No.2, pp. 203 – 210

Bachmann, R., Bauer, T. K., Kluve, J., Schaffner, S., Schmidt, C. M. (2008): Mindestlöhne in Deutschland: Beschäftigungswirkungen und fiskalische Effekte, *RWI Materialien*, No. 4

Bauer, T.K., Kluve, J., Schaffner, S., Schmidt, C.M. (2009): Fiscal Effects of Minimum Wages: An Analysis for Germany; in: *German Economic Review*, Vol. 10, No.2, pp. 224 - 242

Bellmann, L, Bossler, M., Gerner, H.-D., Hübler, O. (2015): Reichweite des Mindestlohnes in deutschen Betrieben; in: *IAB-Kurzbericht*, No.6

Bofinger, P. (2014): Grundzüge der Volkswirtschaftslehre, Hallbergmoos

Bossler, M., Gerner, H.D. (2016): Employment effects of the new German minimum wage. Evidence from establishment-level micro data, IAB Discussion Paper 10, Nürnberg

Brenke, K.; Müller, K. U. (2013): Gesetzlicher Mindestlohn: kein verteilungspolitisches Allheilmittel, in: *DIW Wochenbericht*, 80, 39, 3-17

Darity, W.A., Horn, B.L. (1988): Involuntary Unemployment Independent of the Labor Market; in: *Journal of Post Keynesian Economics*, Vol. 10, No.2, pp. 216 – 224

Davidson, P. (1994): Post Keynesian Macroeconomic Theory. A Foundation for Successful Economic Policies for the Twenty-first Century, Cheltenham

Davidson, P., Smolensky, E. (1964): Aggregate Supply and Demand Analysis, New York

Doucouliagos, H., Stanley, T. D. (2009): Publication Selection Bias in Minimum-Wage Research? A Meta-Regression Analysis; in: *British Journal of Industrial Relations*, Vol. 47, No. 2, pp. 406-428

Felipe, J., McCombie, J.S.L. (2005): How sound are the foundations of the aggregate production function?; in: Eastern Economic Journal, Vol. 31. No. 3, pp. 467 -

Falck, O.; Knabe, A.; Mazat, A.; Wiederhold, S. (2013): Mindestlohn in Deutschland: Wie viele sind betroffen?, in: *Ifo-Schnelldienst* 66, 24, 68-73

Franz, W. (2007): Der trügerische Charme des Mindestlohns; in: *Zeitschrift für Arbeitsmarktforschung*, H. 4, pp. 431 – 438

Görzig, B. (1998): Kostensenkung - eine Strategie für mehr Wohlstand und Beschäftigung? : Ergebnisse quantitativer Szenarien für Deutschland bis zum

Jahr 2010, Friedrich-Ebert-Stiftung, Abt. Wirtschaftspolitik, Reihe "Wirtschaftspolitische Diskurse", No. 115, Bonn

Hamermesch, D. (1986): The demand for labor in the long run; in: Ashenfelter, O., Layard, R. (eds.); Handbook of Labor Economics, Vol. I, Amsterdam

Heise, A. (2017a): 'Walras' Law in the Context of Pre-Analytic Visions: a Note.' *Economic Thought*, 6(1), pp. 83-96

Heise, A. (2017b): Reconciling facts with fiction. Minimum Wages in a Post-Keynesian Perspective, ZÖSS Discussion Paper No. 64, University of Hamburg

Heise, A. (2008): Economic Governance and Employment. Policy, Polity and Politics of Economic Rise and Decline, Berlin

Heise, A. (1999): Grenzen der Deregulierung. Institutioneller und struktureller Wandel in Großbritannien und Deutschland, Berlin

Heise, A. (1998): Ungleichheit und Beschäftigung aus makroökonomischer Perspektive; in: Heise, A. (ed.); Renaissance der Makroökonomik, Marburg, S. 241 – 266

Heise, A., Thieme, S. (2016): The Short Rise and Long Fall of Heterodox Economics in Germany After the 1970s: Explorations in a Scientific Field of Power and Struggle; in: *Journal of Economic Issues*, Vol. 50, No. 4, pp. 1105-1130

Heitger, B. (2003): Minimum Wages and Employment: The Case of German Unification; in: *International Economic Journal*, Vol. 17, No.1, pp. 1 – 15

Herr, H., Kazandziska, M. (2011): Principles of minimum wage policy : economics, institutions and recommendations; Global Labour University working papers ; No.11

Herr, H., Kazandziska, M., Mahnkopf-Praprotnik (2009): The theoretical debate about minimum wages; Global Labor University working papers No. 6

Heumer, M.; Lesch, H.; Schröder, C. (2013): Mindestlohn, Einkommensverteilung und Armutsrisiko; in: *IW-Trends*, Nr. 1

Hirsch, B. T., Kaufman, B., Zelenska, T. (2011): Minimum Wage Channels of Adjustment; IZA Discussion Paper No. 6132. Germany: Institute for the Study of Labor

International Labour Office (ILO) (2014): Minimum wage systems. General Survey of the reports on the Minimum Wage Fixing Convention, 1970 (No. 131), and the Minimum Wage Fixing Recommendation, 1970 (No. 135), Geneva

Kalina, T.; Weinkopf, C. (2013): Niedriglohnbeschäftigung 2011. IAQ Report, 2013-01

Keynes, J.M (1940): Comment, in: *The Economic Journal*, Vol. 50, No.197, pp. 154 - 156

Keynes, J.M. (1939): Professor Tinbergen's Method, in: *The Economic Journal*, Vol. 49, No. 195, pp. 558-568

Keynes, J. M. (1936): The General Theory of Employment, Interest and Money, London

Knabe, A., Schöb, E., Thum, M. (2014); Der flächendeckende Mindestlohn; in: Perspektiven der Wirtschaftspolitik, Vol.15, No. 2, pp. 133–157

König, M./Möller, J. (2007): Mindestlohneffekte des Entsendegesetzes? Eine Mikrodatenanalyse für die deutsche Bauwirtschaft, Institut für Arbeitsmarkt- und Berufsforschung (IAB), IAB Discussion Paper No. 30/2007, Nürnberg

Kregel, J. (1984/85): Sidney Weintraub's Macrofoundations of Microeconomics and the Theory of Distribution; in: *Journal of Post Keynesian Economics*, Vol. 7, No.4, pp. 540 - 558

Lavoie, M. (2014): Post-Keynesian Economics. New Foundations, Cheltenham

Lucas, R.E. Jr. (1981): Studies in Business Cycle Theory, Oxford

Machin, S., Manning, A., Rahman, L. (2003): Where the minimum wage bites hard: Introduction of minimum wages to a low wage sector; in: *Journal of the European Economic Association*, Vol. 1, No. 1, pp. 154–180

Manning, A. (2003): Monopsony in motion, Princeton

Modigliani, F. (1944): Liquidity Preference and the Theory of Interest and Money; in: *Econometrica*, Vol. 12, No.1, pp. 45 - 88

Neumark, D., Salas, J.M.I., Wascher, W. (2014): Revisiting the Minimum Wage-Employment Debate: Throwing out the Baby with the Bathwater?; in: *ILR Review*, Vol. 67, Issue 3, pp. 608 - 648

Neumark, D., Wascher, W. L. (2008). Minimum Wages. Cambridge, Massachusetts: The MIT Press

Paloyo, A.R., Schaffner, S., Schmidt, C.M. (2013): Special Issue of the Effect of Minimum Wages in Germany: Editorial; in: *German Economic Review*, Vol. 14, No.3, pp. 255 - 257

Pigou, A.C. (1933): The Theory of Unemployment, London

Pusch, T. (2018): Bilanz des gesetzlichen Mindestlohns: deutliche Lohnerhöhungen, verringerte Armut, aber auch viele Umgehungen; in: *Wirtschaftsdienst*, Vol. 98, No. 3.

Pusch, T., Heise, A. (2010): Central banks, trade unions, and reputation - is there room for an expansionist maneuver in the European Union?, in: *Journal of Post Keynesian Economics*, Vol. 33, No. 1, pp. 105-126

Ransom, M., Sims, D. (2010): Estimating the firm's labor supply curve in a new monopsony framework: Schoolteachers in Missouri; in: *Journal of Labor Economics*, Vol. 28, No. 2, pp. 331–355

Sachverständigenrat (SVR) (2013): Jahresgutachten 2013/14: Gegen eine rückwärtsgewandte Wirtschaftspolitik, Wiesbaden

Schmitt, J. (2013): Why Does the Minimum Wage Have No Discernible Effect on Employment?; Center for Economic and Policy Research, New York

Schuster, T. (2013): Mindestlohn. Beschäftigungsrisiken höher als behauptet; in: IW policy paper 19, Institut der deutschen Wirtschaft, Cologne

Seccareccia, M. (1991): Salaire minimum, emploi et productivité dans une perspective post-keynésienne; in: *L'Actualité économique,* 672 (1991): 166–191

Setterfield, M. (2006): Effective demand and endogeneous money in a pathdependent economy: towards a "Moorian" credit supply curve – and a reconciliation between horizontalists and structuralists?, in: Setterfield, M.; Complexity, Endogenous Money And Macroeconomic Theory : essays in honour of Basil J. Moore, Cheltenham (: Edward Elgar), pp. 119 – 139

vom Berge, P., Kaimer, S., Copestake, S., Croxton, D., Eberle, J., Klosterhuber, W. (2017): Arbeitsmarktspiegel : Entwicklungen nach Einführung des Mindestlohns, Ausgabe 3, IAB, Nürnberg

Weintraub, S.(1957): The Micro-Foundations of Aggregate Demand and Supply; in: *Economic Journal*, Vol. 67, No. 267, pp. 455 - 477

Wolfson, P., Belman, D. (2014): What Does the Minimum Wage Do? Kalamazoo, MI: Upjohn Institute for Employment Research.