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Crowding Out of Informal Economy Labour Supply by Unconditional Child Benefits

Wypieranie z podaży pracy pracowników z szarej strefy przez bezwarunkowe zasiłki na dzieci

Abstract

The article proposes a modified version of a theoretical model that crowds out less educated workforce from the informal economy in response to a shock in government transfers. The negative impact of universal child benefits (UCB) is measured by the outflow of labour from the informal economy in Poland. After it was introduced in the country in 2016, the "Family 500+" child benefit programme probably caused a permanent outflow of some 160,000 jobs from the labour market. The study verifies this assumption with a real business cycle (RBC) model, with two types of households responding to a positive shock resulting from government transfers. The endogenous growth factor in the model results from the rate of return on higher education and lifelong learning. The model describes the statistical aggregates of the Polish economy. A Bayesian estimation shows an acceptable fit to the time series, which allows for wider use of the fiscal impulse resulting in a decline in the economic activity of beneficiaries. The study adds to a debate on the margins of government intervention in the economy, which at some point may displace less educated workers in the shadow economy.

Keywords:
labour market, real business cycle, crowding out, government transfers, informal economy

JEL classification codes:
C61, E24, E62, H53, I26

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Streszczenie

Artykuł proponuje modyfikację rozwiązania teoretycznego, które powoduje wypieranie słabiej wykształconej siły roboczej z szarej strefy w odpowiedzi na skokowy wzrost transferów rządowych. Negatywny wpływ powszechnych zasiłków na dzieci (UCB) mierzy odpływ podaży pracy z szarej strefy. Po ich wprowadzeniu w 2016 r. najprawdopodobniej na stałe ubyło z rynku pracy ok. 160 tys. kobiet. Badanie weryfikuje to założenie z modelem realnego cyklu koniunkturalnego (RBC), z dwoma typami gospodarstw domowych, które reagują na pozytywny szok wynikający z transferów rządowych. Czynnik endogeniczny wzrostu w modelu wynika ze stopy zwrotu z wykształcenia wyższego i uczenia ustawicznego. Model dobrze opisuje agregaty statystyczne polskiej gospodarki. Estymacja bayesowska również wykazuje akceptowalne dopasowanie do szeregów czasowych, co pozwala na szersze zastosowanie w innych przypadkach impulsu fiskalnego skutkującego spadkiem aktywności zawodowej beneficjentów. Badanie wnosi wartość dodaną do dyskusji na temat marginesów interwencji rządu w gospodarkę, która w pewnym momencie może wypierać gorzej wykształconych pracowników w szarej strefie.

Słowa kluczowe:
rynek pracy, szara strefa, realny cykl koniunkturalny, wypieranie, transfery rządowe

Kody klasyfikacji JEL:
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Introduction

The countercyclical fiscal expansion of several economies during the latest financial crisis seemed to encourage policy makers to apply the same measures to the post-crisis period. Keynesian multipliers provide mixed empirical evidence in the procyclical phase of economies, pointing to either further discretionary fiscal stimulation or populist vote-getting policies. Too much remedy may cause some adverse effects for the labour market, for example. There are cases where fiscal stimulus causes an outflow of a significant portion of workers to permanent unemployment.

This paper adopts a theoretical approach to examine empirical evidence on the impact of fiscal stimulus packages that negatively affect labour market supply for some beneficiaries who substitute labour income with government transfers. This study offers a real business cycle (RBC) model to explain such crowding-out for a part of the labour supply through a fiscal transfer shock. The accuracy of the model is tested against actual data, namely the reaction to the introduction in 2016 of a universal child benefit programme (UCB) in Poland called "Family 500+".

In the typical RBC model (e.g. **Aiyagari** [**1992**]), the government spending shock raises taxes to be financed and causes a crowding in of the labour supply in order to keep the maximised utility, based mainly on consumption. Furthermore, households in the new steady state end up with lower investments and capital. To this end, the extension proposed in this article needs to do the opposite for some part of the labour supply (assumed as informal): to crowd out informal labour from the market by the substitution effect stemming from excessive government transfers. The applied model is fairly simple with respect to the actual economic reality, and it focuses only on a single channel of impact between government transfers and household labour supply. In spite of the existence of many additional factors that may influence the labour market, the presented mechanism fits well to the time series and gains from its universality.

The paper is organised in the following way: after this introduction and literature review in section 2, section 3 describes the model, and chapter 4 brings an analytical solution. Chapter 5 covers the parametrisation, followed by the estimation procedure in Chapter 6. Chapter 7 provides the results of the temporary shock, and the study concludes with Chapter 8 and the references.

Literature review

While many studies focus on the reaction of private consumption to fiscal stimulus, or more precisely transfer shock, there is a literature gap on the detrimental effects for the informal economy labour supply. This study builds on three streams of the literature.

First, it explores the well settled difference between the so-called Keynesian and neoclassical reactions of the economy to fiscal stimulus. While the Keynesian approach assumes price stickiness in the short run, including wages, government transfers lead to an increase in wages, employment and demand. This is discussed in the seminal papers of **Blanchard and Perotti** [**2002**] and **Gali** [**2007**]. The latter study introduces "rule-of-thumb" consumers, who, in the absence of financial markets, consume all additional income. Meanwhile, the neoclassical approach assumes that fiscal expansion results in a long-term effect where all factors of production adjust. Therefore, tax-financed transfers reduce wages, and thus permanent income. In order to keep their consumption high, households increase their labour effort on the intensive margin, as, e.g., in **Baxter and King** [**1993**] and more recently **Farmer and Plotnikov** [**2012**].

Second, a specific case of employment changes can be found in, e.g., **Mayer et al.** [**2010**], suggesting that a positive government expenditure shock reduces aggregated unemployment where there are fewer consumers with a constrained budget.

Third, the government transfer shock can be represented in empirical data by the universal child benefit (UCB), and its "universality" is understood as a lack of means-tested conditionality for the beneficiaries. While the applied model in this study differentiates between formal and informal economy labour, both groups receive

the UCB, but react differently in terms of labour effort, to reflect the empirical evidence. And the empirical evidence covers studies on the influence of UCBs on labour market activity, e.g. **Naz** [**2004**], **Gonzales** [**2011**], and **Hernandez-Aleman** [**2017**] for Europe; **Szabo-Morvai** [**2014**] and **Shirle** [**2015**] for Canada; and **Magda** [**2018**] for Poland. They generally confirm a crowding out of women from the labour market, especially those with poorer educational status.

Starting from the last of the abovementioned literature points, the crowding out of some labour by transfers observed in data seems to be not completely developed in theory, which leaves an important research gap. This study attempts to provide the theoretical regularity in order to address similar cases in the future.

In terms of points 1 and 2 above, the study builds a consistent theoretical RBC model extension that merges the features of the Keynesian and neoclassical models. In other words, the fiscal shock needs to crowd in one group while crowding out another (i.e. informal economy beneficiaries). The subsequent model description tackles this issue in detail.

The model

The study applies the RBC model with a semi-endogenous growth factor stemming from human capital based on education and learning-by-doing (LbD), with infinitely living agents. An infinite number of competitive firms produce a continuum of homogeneous goods. The government levies proportional taxes on production factors and consumption to finance family-related transfers and other expenditures. In this closed economy, there is no public debt or financial sector.

Households

Formally, in the applied model, the time is discrete, and two representative, infinitely living households are described by a utility function taking consumption and a disutility from the labour supply. These two types of households are distinguished on the basis of their attitude to the labour supply: formal (or educated) economy households and informal economy households (with lower education status). They have comparable preferences but different endowments, and their proportions are set by the proportion of $(1-b)$ for the formal sector and b for uneducated/informal economy households.

Formal-sector households

The better educated group represents the formal labour force, which takes utility U^m_{t+1} discounted by factor β, as follows:

$$\max_{K^m_t,\, I^m_t,\, q_t,\, H_t,\, C^m_t,\, L^s_t} U^m_t = \beta E_t\left[U^m_{t+1}\right] + \frac{C_t^{m\,1-\sigma^c}}{\left(1-\sigma^c\right)} - \frac{L_t^{m\,1+\sigma^l}}{\left(1+\sigma^l\right)}, \tag{1}$$

where consumption is denoted by C^m and the disutility of labour is denoted by L^m for formally hired households. The inverse of the elasticity of intertemporal substitution is denoted by σ^c, and the inverse Frisch elasticity of labour supply is denoted by σ^l. The above stated maximisation problem is subject to the following budget constraint:

$$I^m_t + \left(1+\tau^c\right)C^m_t = Div_t + T_t + \left(1-b\right)B_t + \left(1-\tau^k\right)r_t K^m_{t-1} + \left(1-\tau^l\right)H_{t-1}q_t L^m_t W_t \tag{2}$$

The formal labour market household receives a smaller portion of family benefits B (limited by the b factor), and exhibits a smaller substitution effect from family-related government transfers. Div stands for dividends paid by firms to households in a fully competitive environment; r is the price of capital borrowed by firms from households; I^m stands for their investments. The proportional, effective tax rates τ^l, τ^k and τ^c

are imposed respectively on formal-sector labour supply L^m, capital supply K^m and household consumption C^m respectively. The formal-economy households are endowed with human capital H, which is partly (by q share) used for production, for which they receive wages W. The household rents time and capital K^m (formal sector only) to competitive firms. The law of motion of physical capital K^m takes the following form:

$$K_t^m = I_t^m + \left(1 - \delta\right)K_{t-1}^m. \tag{3}$$

The human capital H, regarded here as a semi-endogenous growth factor, is derived from the rate of return on higher education and learning-by-doing (LbD), with the methodology taken from **Uhlig** [**2011**]. The internal rate of return from a higher education degree is based on **Mincer** [**1958**] calculated as in **Jabłonowski** [**2021**]. Basically, LbD adds the discounted net-of-tax additional income, as proposed by **Burdett** [**2011**]. The human capital is partly (by q share) used for production, while the remaining time $(1-q)$ needs to be devoted to LbD. Finally, they are paid for actual labour time L^d net of time devoted to learning, with a standard notation for salary W. The semi-endogenous growth factors S and A stand for the internal rate of return from investment in (higher) education and LbD respectively and are not attributed to informal-economy UCB beneficiaries to reflect the lower educational achievements and different time constraints. Despite mixed literature evidence, the physical and human capital in this study depreciate at the same rate δ and δ^h, for simplicity, and that is why they are distinguished. The elasticity between the time devoted to (higher) education and LbD is set on the basis of the Ω parameter. All these are summarised in the following equation:

$$H_t = H_{t-1}\left(1 - \delta^h\right) + H_{t-1}^{1-\Omega}\left(Aq_tL_t^m + SL_t^m(1-q_t)\right)^{\Omega} \tag{4}$$

Informal-sector households

The novelty in the theoretical approach aiming to fill in research gaps stems from the fact that informal-economy households share their time between untaxed labour supply borrowed by firms and a kind of "home production", as described by **Benhabib** [**1991**], understood as home production activity recorded in satellite national accounts. Their modelled behaviour with respect to the response to fiscal stimulus needs to be the opposite to that of formal-economy labour. To reflect its informal economy participation or non-recorded self-employment, their capital (denoted below as K^h) does not enter the economy production function. The explanation may be as follows: The ownership of real estate by less educated, informal-economy households may be to a much greater extent regarded as consumption rather than productive capital. In this sense, they are similar to home production. Another similarity is that, as in the case of home production, there is a lack of other government expenditures, i.e. T, including pensions. This pushes informal-economy households towards the precariat. Government family support is a substitute of formal employment income. Their labour market production is untaxed. What differs this group from the home production model is that the firms borrow their labour hours L^h, which occurs twice: partly (limited by b factor) in the untaxed labour demand expressed by firms L^d, and in full capacity in the budget constraint for the type of home production as defined above. The steady-state L^h solution value may reveal the optimum aggregate for untaxed labour and informal (home, satellite) production. The consumption tax imposed on their final demand $\left(1 + \tau^c\right)C^h$ also includes the consumption of the informal (home) production part. This group exhibits greater substitution with the UCB (labelled B in the model) than the general labour force in the economy, which should help to crowd them out after a fiscal stimulus. Informal-economy UCB families appear to be in part home producers, and they may in fact be regarded as such since they seem to highly value home production. They abandon their untaxed jobs when a significant part of their income is replaced with informal-economy UCB after a positive fiscal stimulus.

At the equation level, the informal-economy household solves the following optimisation problem:

$$\max_{K_t^h,\, I_t^h,\, C_t^h,\, L_t^h} U_t^h = \beta E_t\left[U_{t+1}^h\right] + \frac{C_t^{h1-\sigma^c}}{\left(1-\sigma^c\right)} - \frac{L_t^{h1+\sigma^l}}{\left(1+\sigma^l\right)} \tag{5}$$

s.t.

$$K_t^h = I_t^h + K_{t-1}^h\left(1-\delta\right) \tag{6}$$

$$I_t^h + C_t^h\left(1+\tau^c\right) = bB_t + K_{t-1}^{h\ \theta} L_t^{h1-\theta} \tag{7}$$

In the second budget constraint (7), informal economy consumption is equalised by a larger portion of family-related *B* transfers, including the new universal child benefit (UCB) from the Polish government's "Family 500+" programme. They do not have access to financial markets though they exhibit the same patience (i.e. set by β) as the first type of households.

Firms

There are identical firms that solve their optimisation problem by maximising profits Π:

$$\max_{K_t^d,\, L_t^d,\, Y_t,\, \pi_t} \Pi_t = \pi_t \tag{8}$$

s.t.

$$Y_t = Z_t^m K_t^{d\alpha} H_{t-1} q_t L_t^{d1-\alpha} \tag{9}$$

$$\pi_t = Y_t - r_t K_t^d - H_{t-1} q_t L_t^d W_t. \tag{10}$$

The firms express their demand for physical K^d and a part of the human capital $q_t H_{t-1}$ from the previous period, but only for formal market labour supply households, as well as labour L^d from both groups. In order to scale the small group of the informal labour force accordingly, the overall labour supply consists in major part of the formal labour force: $L_t^d = \left(1-b\right)L_t^m + bL_t^h$. Wage W is common for formal market labour supply L^m and informal economy L^h. In fact, members of the better educated, formal labour force spend proportionally less time working, but are more productive since they engage their human capital portion qH. The informal-economy household wage is not reduced by the labour tax paid by employers. The physical capital is borrowed from non-beneficiaries at rate r_t, and technology (TFP) is represented by exogenous shock z^m in the Cobb-Douglas production function, with α share of capital. Note that human capital spurs labour, but not physical capital. The technology follows the first-order autoregressive process:

$$Z_t^m = e^{\epsilon_t^m + \phi \log Z_{t-1}^m}. \tag{11}$$

This shock is crucial for the development of the model, so it is estimated with the Bayesian estimation procedure explained later.

Government

The government obeys a standard balanced budget policy, without debt, as follows:

$$B_t = \overline{B}_t \epsilon_t^b \tag{12}$$

$$B_t + T_t = \tau_t \tag{13}$$

$$\tau_t = \tau_t^C + \tau_t^L + \tau_t^K \tag{14}$$

$$\tau_t^C = \tau_t^c C_t \tag{15}$$

$$\tau_t^L = \tau^L H_{t-1}\, q_t L_t^d W_t \tag{16}$$

$$\tau_t^K = \tau^K K^m{}_{t-1} r_t. \tag{17}$$

There are three types of effective, proportional tax rates imposed on: formal market labour τ^l, capital τ^k, and consumption τ^c. The consumption taxes are imposed on the overall consumption. A lack of home capital taxation, to be e.g. imposed on the "return" on informal economy capital K^h refers to a lack of inheritance tax. This means that in an infinite time horizon the bequests are tax free. These three types of taxes sum up to total effective tax revenues τ. The government collects taxes to balance family-related expenditures B, with the government family expenses shock understood here as the UCB programme. Then there are the remaining government expenditures T taken directly to households budget constraints in cash (e.g. pensions and other expenditures).

The shock represents an additional portion of family transfers to all households:

$$\log \epsilon_t^B = \eta_t^B + \rho^B \log \epsilon_{t-1}^B \tag{18}$$

Market clearing conditions

The market clears for capital, labour and investment under the conditions stated below:

$$K_t = K_t^m + K_t^h \tag{19}$$

Again, the firms express demand L^d for formal-market labour supply L^m and informal-economy labour supply L^h, but not for capital K^h. The informal-economy capital develops, while investment in the economy contains a tiny proportion of informal-economy investment, so co-movement is guaranteed by equation $K_t = K_t^m + K_t^h$. No interest rate is levied on capital K_t^h, which means it is treated in the same way as informal economy and home production capital.

Derivation of the resource constraint

We start with an extended formula for government transfers, where $C_t = C_t^m + C_t^h$ and $I_t = I_t^m + I_t^h$:

$$T_t = \tau^L H_{t-1} q_t L_t^d W_t + \tau^C C_t + \tau^K r_t K_{t-1}^m$$

The government family-related benefit (including child unconditional transfers) B does not represent the full government expenses, while the remaining government expenditures are already included in the households' budget constraint. A modified government revenue and consumption formula can be plugged into the households' budget constraint replacing transfers. Note that only the formal-economy households' capital is engaged in the formula:

$$\left(1+\tau^C\right)C_t + I_t = \pi_t + \left(1-\tau^K\right) r_t K_{t-1}^m + \left(1-\tau^L\right) H_{t-1} q_t \left(1-b\right) L_t^m W_t + b L_t^h W_t + \tau^L H_{t-1} q_t L_t^d W_t + \tau^C C_t + \tau^K r_t K_{t-1}^m$$

After simplifying for the redundant tax rates and given the earlier assumed $L_t^d = \left(1-b\right) L_t^m + b L_t^h$, we get:

$$I_t + C_t = r_t K_{t-1}^m + H_{t-1} q_t L_t^d W_t + \pi_t$$

The dividends, which equal zero in a fully competitive market, may be replaced by their formula from the firm's budget constraint:

$$I_t + C_t = H_{t-1} q_t L_t^d W_t + r_t K_{t-1}^m - H_{t-1} q_t L_t^d W_t - r_t K_{t-1}^m$$

while $K_t^d = K_{t-1}^m$, then finally, after rearranging, we obtain an outcome similar to that known from the national accounts:

$$Y_t = I_t + C_t$$

The parametrisation

All but two shock parameters are calibrated and taken from the literature. Generally, it is presumed that households are mainly beneficiaries of government transfers in cash, so the substitution effect prevails. Table 1 summarises the parameters applied in the model:

Table 1. Parameters used in the model (prior)

θ	b	σ^l	σ^c	τ^l	τ^k	τ^c
0.1	0.1	1.6	1.8	0.45	0.2	0.25
A	S	Ω	α	δ	δ^h	β
0.01	0.07	0.7	0.33	0.025	0.025	0.99

Source: Author's own calculations.

The parameters for physical capital depreciation δ and discount factor β were taken from the general literature. **Weber [2008]** estimates much lower deprecation of human than physical capital, but this issue is only briefly mentioned here as it exceeds the research interest of this study. The internal rates of return from investment in higher education S and learning-by-doing A are explained in **Jabłonowski [2021]**, and show nearly doubled returns to schooling and LbD. If these are applied in the model, the labour time devoted by the formal market labour supply is underestimated, i.e. the wage fund in the economy WL^d amounts to 15% of the product, which is due to an enormously high human capital return $q_t H_{t-1}$. So to reflect the actual wage fund of 30% of the product, the rates of return on education need to be halved to the values shown in Table 1.

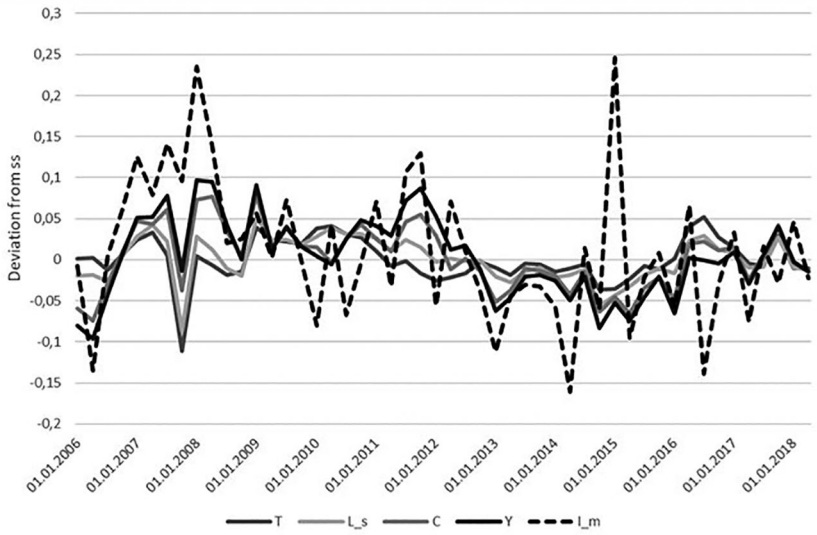
The proportion of family-engaged capital K^h reflects an observation from the **HFCS [2015]** that the main residence of lower educated families is usually of lower value than those of highly educated families. The same applies to physical capital investment, which accounts for 2% of the private investments in the economy. The respective shares for informal-economy households are taken from **Magda [2018]**. Where the ratios are available, e.g. in the literature or related models, the variables are calibrated. For example, the government (family) transfers and child-related consumption in cash and in kind B are set at 15% of the GDP. The effective tax rates τ^c, τ^k and τ^l are taken from **Jabłonowski [2018]** for Poland. Human capital δ^h depreciates at the same pace as physical capital δ, which is above the estimates of e.g. **Weber [2008]**, but this is not crucial for the purpose of this study. One exception from the broad literature is the country-specific capital share ratio $\alpha = 0{,}33$, taken from **Kolasa [2009]**. One of the most relevant parameters for depth of the crowding-out effect is the elasticity of the labour supply with respect to wages, i.e. Frisch elasticity, which in the applied model version needs to assume substitutability between wages and labour time. The marginal utility from consumption should be decreasing, while the marginal disutility from labour should be increasing, so they are the same for both types of households.

Estimation procedure

The estimation of the log-linearised version of the model relies on fitting to macroeconomic variables from quarterly non-financial accounts for the period 2001q1–2018q2, with the UCB shock applied in 2016q2. Therefore, these statistics by institutional factors are used to calibrate product Y, final demand by households

$C = C^m + C^h$, government (family) transfers and family-related consumption in cash and in kind B, other government transfers and expenditures T, and investment I in the economy. The labour supply L^m comes from Labour Force Survey (LFS) working population statistics. The human capital H, the portion of human capital used in production q, and the share of capital in product K stem from the model solutions, with $K/Y = 7.11$. The accuracy of calibration seems acceptable. Figure 1 below shows the input time series development for the abovementioned variables. While the model is assumed to be stationary, the time series are logarithms, seasonally adjusted, de-trended with the HP filter $(\lambda = 1600)$.

Figure 1. Key time series used in the input model

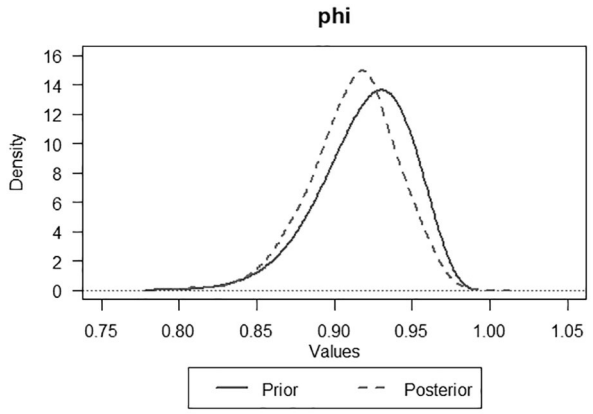


Source: Author's own calculations.

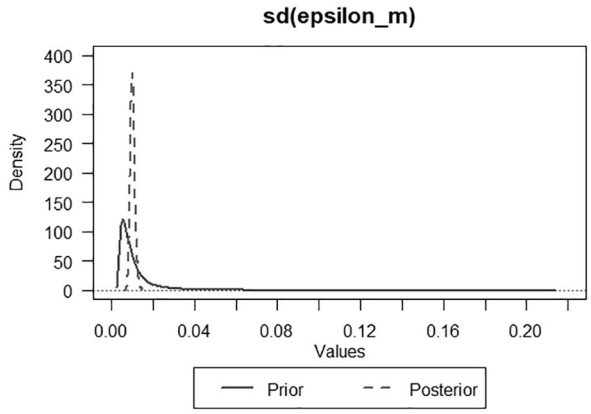
The shock parameters for the TFP Z^m and government UCB shock η^B were estimated with the Bayesian estimation according to a procedure described in **gEcon** [**2016**] programming language. Figures 2 and 3 show in the columns: a) parameter prior and posterior distributions, and b) standard deviation from steady-state for autocorrelation parameter after the shock. Figure 2 shows Z^m shock distribution and Figure 3 refers to the family transfers shock B.

Figure 2. Parameters φ and $sd(\sigma^m)$

(a) Parameter φ



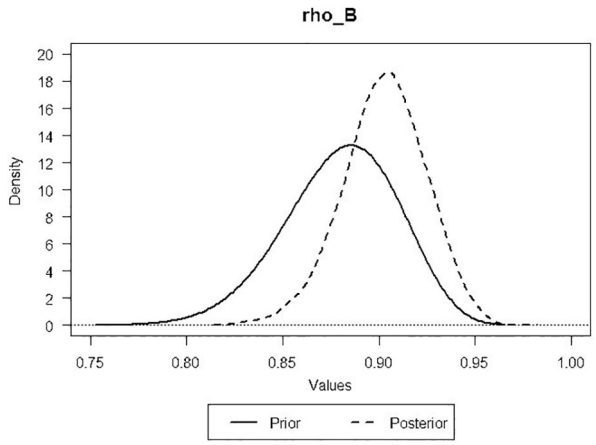
(b) Parameter $sd(\sigma^m)$



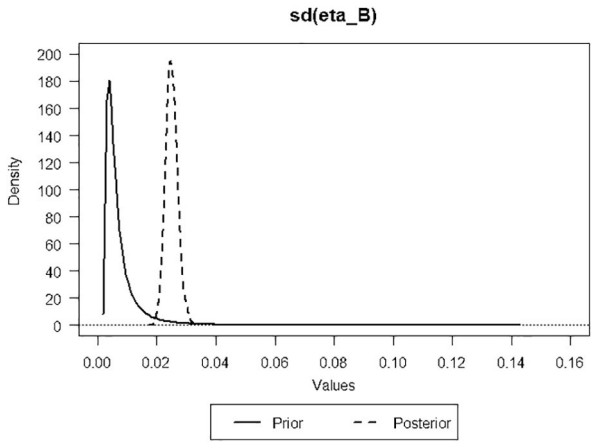
Source: Author's own calculations on the basis of national accounts and LFS.

Figure 3. Parameters ρ^B and $sd(\eta^B)$

(a) Parameter ρ^B



(b) Parameter $sd(\eta^B)$



Source: Author's own calculations on the basis of national accounts and LFS.

Table 2 below summarises the applied prior and posterior values of the parameters used in the model.

Table 2. Parameters used in the model (prior) parameter type

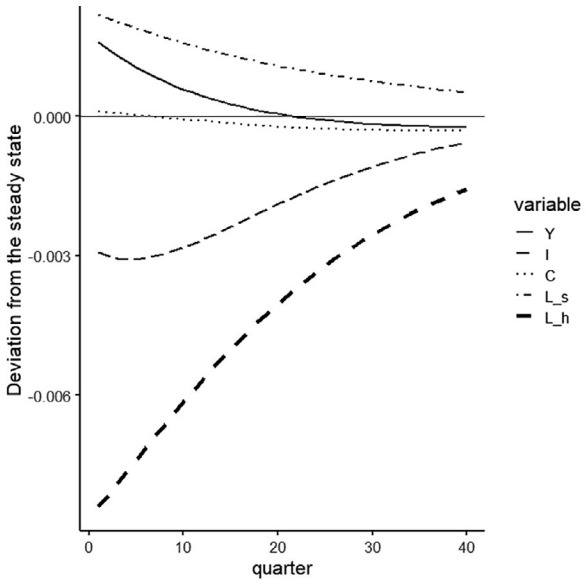
		Prior mean	Prior SD	Posterior mean	Posterior SD
$sd(\sigma^m)$	Inv. gamma	0.012	0.3	0.011	0.001
ϕ	beta	0.92	0.03	0.90	0.027
$sd(\eta^B)$	Inv. gamma	0.008	0.3	0.027	0.002
ρ^B	beta	0.88	0.03	0.897	0.021

Source: Author's own calculations.

Results

The 10% exemplary shock for the UCB transfer is shown in Figure 4 below. The shock causes a drop in informal economy labour supply L^h, and a corresponding increase in formal market labour supply L^m, which fulfils the aim of the study.

Figure 4. Impulse response function for 10% for η^B shock

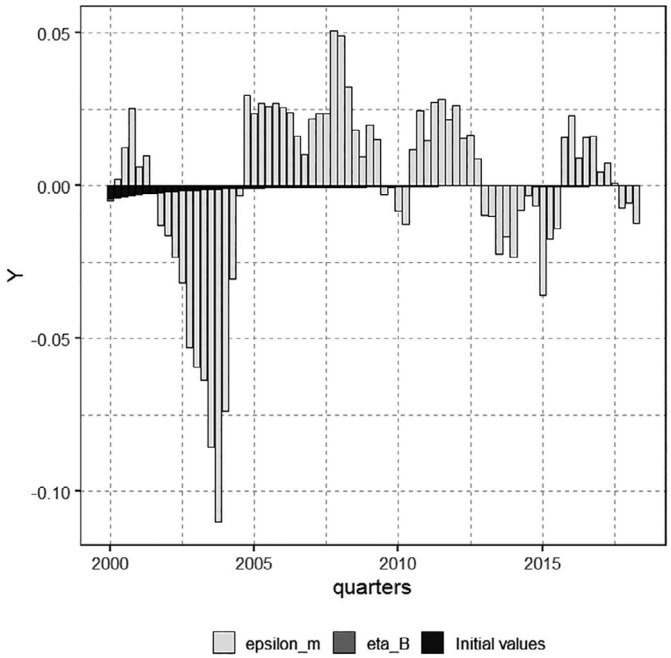


Source: Author's own calculations.

The reaction of aggregated consumption *C* is positive, and so is the reaction of the product. The model mimics well the typical reaction of RBC models, i.e. significantly decreasing investment (with the capital path skipped from the graph for clarity). The exemplary shock progression depicted in Figure 4 is based on prior parameter distribution and reflects well the general reaction of key economic aggregates after the introduction of the UCB in mid-2016.

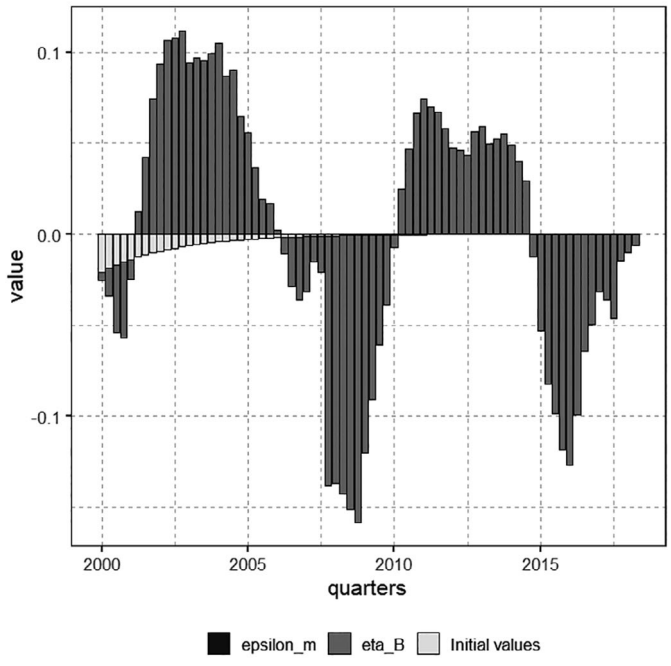
The shocks' decomposition after the Bayesian estimation mimics the development of the TFP for product *Y*, as depicted in the graph below, clearly vanishing after 2015. The initial values are taken from the example in Figure 5 below:

Figure 5. Smoothed shocks for Z^m and η^B



Source: Author's own calculations.

Figure 6. Decomposition of variance of the shock for UCB

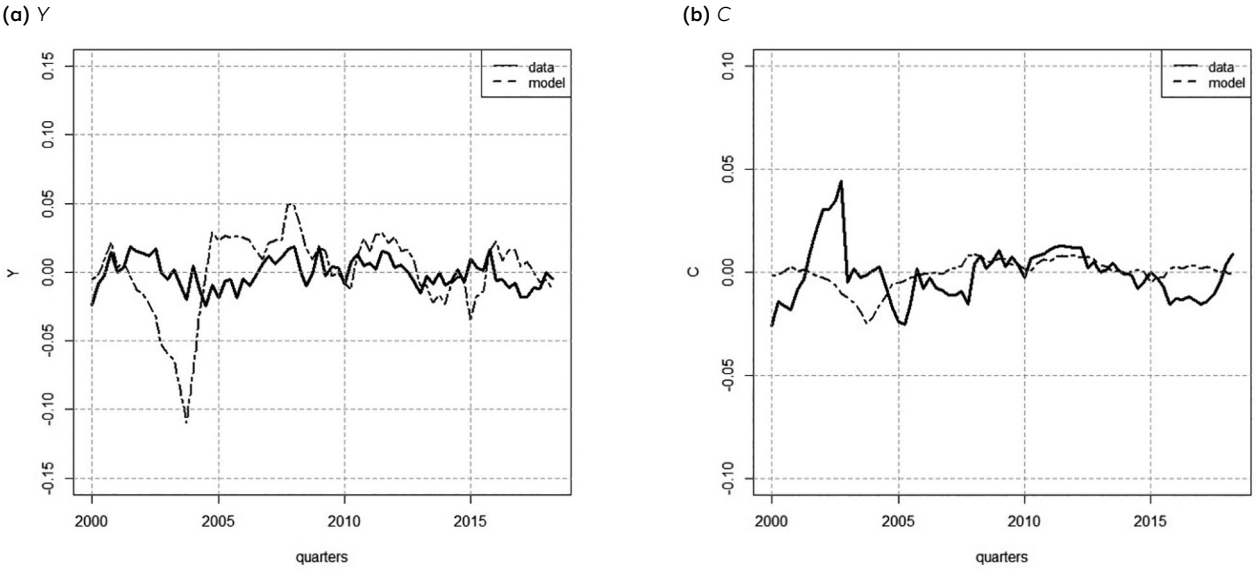


Source: Author's own calculations.

More importantly, the UCB shock including informal-economy households explains the depth of the *B* shock very well. However, it is less persistent in the modelled time series than in actual data. Provided that the actual shock was initiated in the first half of 2016, a clear rising path can be spotted for η^B in Figure 6.

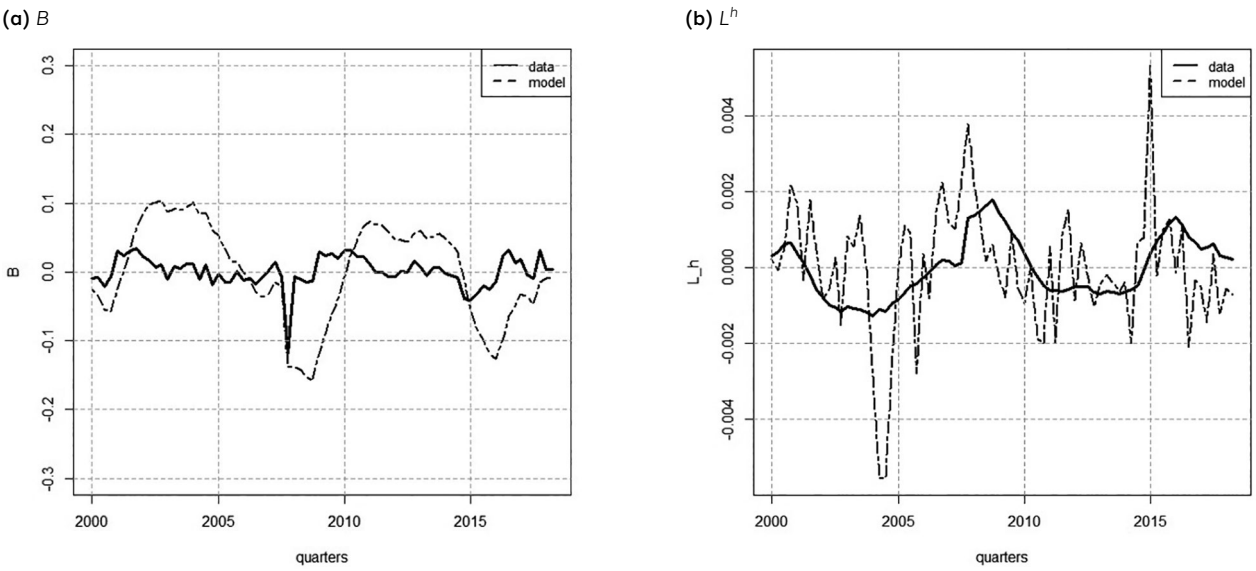
The other variables match the data with an acceptable tolerance: product *Y* and its components, family transfers *B*, UCB household labour supply L^h, and aggregate investment *I*, as shown in Figures 7 and 8 below:

Figure 7. Adequacy of matching for product *Y* and consumption *C*



Source: Author's own calculations.

Figure 8. Adequacy of matching for family transfers *B* and UCB households labour supply L^h



Source: Author's own calculations.

Overall, the model acceptably reflects the time series of the key economic aggregates. Additionally, it reflects well the informal economy labour supply, which is an argument for the application of this tool to assess the crowding-out effect of a part of the labour supply, in this case informal labour, by the fiscal stimulus.

Conclusions

The countercyclical fiscal expansion of several economies during the latest financial crisis seemed to encourage policy makers to apply the same measures to the post-crisis period. Keynesian multipliers provide mixed empirical evidence in the procyclical phase of economies, pointing to either further discretionary fiscal stimulation or populist vote-getting policies. After a political changeover in Poland in 2015, the government launched a set of expansionary fiscal policy measures in the form of the so-called "Family 500+" child benefit programme. This public project is an example of discretionary fiscal expansion via unconditional, family-related government transfers, theoretically aimed at the country's shrinking fertility rate. Empirical evidence suggested a crowding-out of around 160,000 of the nation's 16 million employees from the labour market, mainly those with lower education and a mixed record of registered employment and informal-economy and home production. This example is in many ways similar to international examples of post-crisis, procyclical fiscal expansion cases.

The main aim of this study was to create a theoretical modelling extension to show a crowding-in effect for formal labour (as reported in the literature), and a crowding-out for the informal economy (value added). The model's accuracy is tested against Polish data before and after the introduction of the UCB in 2016.

The aim was achieved, while the applied RBC model reflected acceptably the economic development of the cyclical components of the key economic aggregates distinguished in the model. More importantly for the aim of this article, it reflects well the cyclical fluctuations of the informal economy labour supply, which is an argument for the application of this tool for measuring the crowding-out of a part of the labour supply, specifically informal labour, by fiscal stimulus. Generally, the applied model version can be used in countries with a statistically substantial informal economy where government transfers are intensified.

As regards future research in this field, the symbolic derivation could be improved for a more detailed utility function of the informal economy sector. Households could use e.g. their primary residence as the collateral, which would allow them to make their capital productive in the sense of national accounts. A similar mechanism could be useful in explaining a broader empirical trend of decreasing formal labour intensity in developed economies and among younger generations.

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