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When public policy matters: public intervention and satisfaction with the government

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Abstract. This paper contributes to the economic voting literature by evaluating the effect of a policy-determined income shock on individual-level support for the government. It examines the results of a natural experiment relating to the 2016 Polish job market reform that raised the minimal hourly wage to PLN 12 per hour for all workers, regardless of their contract type, thus asymmetrically affecting low-earning individuals engaged in precarious work. The study employs a detailed microeconomic dataset from the European Social Survey to perform a difference-in-differences analysis. It concludes that the reform had a significant, positive impact on the levels of support received by the government, notably higher than any macroeconomic variable.

Keywords: economic voting, natural experiment, difference-in-differences

JEL: C31, C33, H53, J38

1. Introduction

The theoretical literature on voting highlights two pivotal dimensions of the election design: moral hazard, associated with incentivising politicians to implement policies preferred by the public (Barro, 1973; Feltovich & Giovannoni, 2015), and selection, i.e. allowing people to elect candidates with high individual talents (Duch & Stevenson, 2008; Fearon, 1999; List & Sturm, 2006). A necessary condition for the former concept to be effective is the voters' ability to correctly assess the government's decisions. Such an assessment may cover a broad range of issues, out of which economics plays a vital role (Lewis-Beck & Stegmaier, 2000). Thus, there is a seizable strand of empirical literature evaluating the impact of macroeconomic variables on election output (for summary see ibid.; Brug et al., 2007; Duch & Stevenson, 2008).

Purely macroeconomic studies of economic voting based on either aggregate or individual-level data have been criticised for omitting certain political factors (Powell & Whitten, 1993) or, more recently, for neglecting subjective wellbeing measures (Ward, 2019). Furthermore, the existing body of literature does not offer insights into the effects of singular economic policy interventions which directly impact particular voters' financial situation. Arguably, this might lead to systematic underestimation of the impact of the public policies: intuitively, an individual wage increase by 5% is likely to expand the voter's support for the government more considerably than a 5% GDP growth in the national economy. This article provides an empirical

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measure of the impact of a policy-induced income shock on individual-level support for the government, using Poland's 2016 labour market reform as a natural experiment. Difference-in-differences (DiD) regression is applied as an evaluation tool of the treatment effect, accurately capturing the causal relation between the minimal hourly wage increase and the response in terms of the political support shown by those treated.

The labour market intervention in question offers a unique setting to study the relation between public policy and individual support for the government due to the intervention's specific construction and certain features of the Polish labour market. The key element of the 2016 reform involved raising the minimal hourly wage to PLN 12 per hour for all workers, regardless of their contract type, thus equalling the minimal earnings applicable to employment and Civil Code contract[1] holders (Sejm Rzeczypospolitej Polskiej, 2016). These characteristics allow the identification of the treatment group. Thus, its members had to simultaneously satisfy both of the following conditions in 2016:

1. work under a Civil Code-based contract (non-employment, usually service);
2. earn less than PLN 12 per hour.

Obviously, the treatment group is not random. Therefore, the conclusions drawn from the treatment analysis can be generalised if and only if the selection for the treatment satisfies conditional exogeneity. A number of control variables and population weights were employed to make the generalisation possible.

This paper contributes to the economic voting literature by studying the effect that a policy-induced, individual positive income shock has on the level of satisfaction with the government. Using treatment assessment methodology (DiD) allows the identification of a causal relationship, while accounting for local-specific political and policy control measures provides an opportunity for robust inference.

The article is organised in the following way: Section 2 presents a review of literature on economic voting and discusses this paper's contribution into it. Section 3 focuses on the Polish minimal wage reform of 2016. Section 4 provides an overview of the dataset along with detailed definitions and assumptions used for the creation of the variables. The empirical DiD model and robustness checks are discussed in Section 5. Section 6 consists of final remarks.

2. Literature review

2.1. Benchmark literature

The literature on economic voting can be roughly divided into two parts: the literature on popularity function and vote function analysis (Nannestad & Paldam, 1994; Stegmaier et al., 2017). The former deals with government support rates derived from public opinion surveys, while the latter explores the impact of economic factors on

[1] Polish Civil Code includes two benchmark type of contracts: Service Contract (Pol. umowa zlecenia) and Mandate Contract (Pol. umowa o dzieło), each of which may be used to evade the Labour Code provisions.

voting choices. The popularity function research dates back to the 1970s (Kenski, 1977; Monroe, 1978; Mueller, 1970). The literature concerning the vote function focuses either on the explanation of (Erikson, 1989; Tufte, 1978) or forecasting (Campbell & Garand, 2000) election results. These early analyses usually employ scarce economic regressors, often at macro-aggregate level only. Certain specifications of this type of economic vote models are presented in Table 1.

Table 1. Selected specifications of early economic vote models

Study	Dependent variable	Economic independent variables	Political controls (if included)
Mueller, 1970	US President popularity	Economic slump (% unemployment)	Yes
Monroe, 1978	US President popularity	Inflation and defence spending (with lag distribution)	No
Tufte, 1978	US President vote function	Income	Yes
Erikson, 1989	US President vote function	Income	Yes

Source: author's work.

The papers above set a benchmark for all studies to follow. However, due to aggregation, they neither control for particular voter group characteristics nor allow the study of the impact that specific policy interventions have on voter political attitudes. An interesting attempt to include individual-level, microeconomic factors into economic voting analysis was proposed by Fiorina (1978). He found that individual financial conditions affect decisions at the ballot box, but they seem uncorrelated with the decision whether to vote or not.

2.2. Refinements

Historically, efforts were made to embed voter heterogeneity, especially with respect to asset holding, into economic voting analyses. These efforts produced literature on what is called patrimonial economic voting. Its standard result is that asset-rich voters tend to support right-wing parties, while those less affluent the left-wing. More recently, the patrimonial voting theory has been reconciled with political factor analysis by Hellwig and McAllister (2019). They claim that patrimonial model predictions are accurate as long as the candidates do not differ in the proposed economic policies.

Another important refinement takes into account the role of welfare as a specific economic factor likely to impact voting decisions. Pacek and Radcliff (1995) argue that as welfare spending expands, the effect of the economy on voting decisions diminishes. Their results are supported by Park and Shin (2017), who further control for clarity of the government's political responsibility. However, contradictory evidence, although scarce, exists (Palmer & Whitten, 2003) alongside some inconclusive studies (Brug et al., 2007).

Finally, a variety of literature is emerging on subjective wellbeing measures rather than macroeconomic variables as ballot box outcome determinants. The happiness-voting relation has been studied e.g. by Ward (2019) or Liberini et al. (2017). The former argues that the subjective wellbeing indicator (SWB) explains a higher fraction of incumbent vote share than any standard macroeconomic factor. The latter authors confirm this finding with respect to voting intention. They also contribute to the better understanding of the causal relationship between subjective happiness shocks and individual voting patterns, studying the electoral impact of a spouse's death with the DiD analysis.

3. The Polish minimal wage reform of 2016

3.1. Overview

The duality of the Polish labour market remains a persistent social and economic problem (Kamińska et al., 2014). Until 2016, Civil Code contracts in Poland had not needed to comply with the minimal wage regulations[2]. Moreover, holders of multiple Civil Code contracts were allowed to deduct social insurance contributions from only one of them, thus largely increasing the net-to-gross income ratio. Finally, compared to employment, Civil Code contracts offered significantly more flexibility, e.g. no fixed period of notice, no paid sick leave and no maternity leave.

Hence, strong incentives were convincing enough for employers to shift workers from employment into Civil Code contract-based work. The practice is estimated to have affected from almost 200,000 to over 800,000 workers in 2016 (Chrostek et al., 2019). The estimates are based on the following assumption: individuals who repeatedly sign non-employment contracts with the same entity for similar remunerations are suspected to be actual employees evading the Labour Code. A detailed summary of such a practice is presented in Table 2[3].

Table 2. Number of workers with suspected employment substitution by Civil Code contracts; estimates by total contract duration and wages deviation

Contract duration (no. of months)	Wages deviation			
	1%	5%	10%	20%
6	347,000	469,000	622,000	847,000
8	276,000	361,000	462,000	606,000
10	225,000	265,000	325,000	408,000
12	172,000	184,000	202,000	235,000

Source: Chrostek et al. (2019).

[2] In 2016, the minimal salary for employment contract holders was set at PLN 1,850 per month, equivalent to approx. PLN 12 per hour in full-time employment (Sejm Rzeczypospolitej Polskiej, 2016).

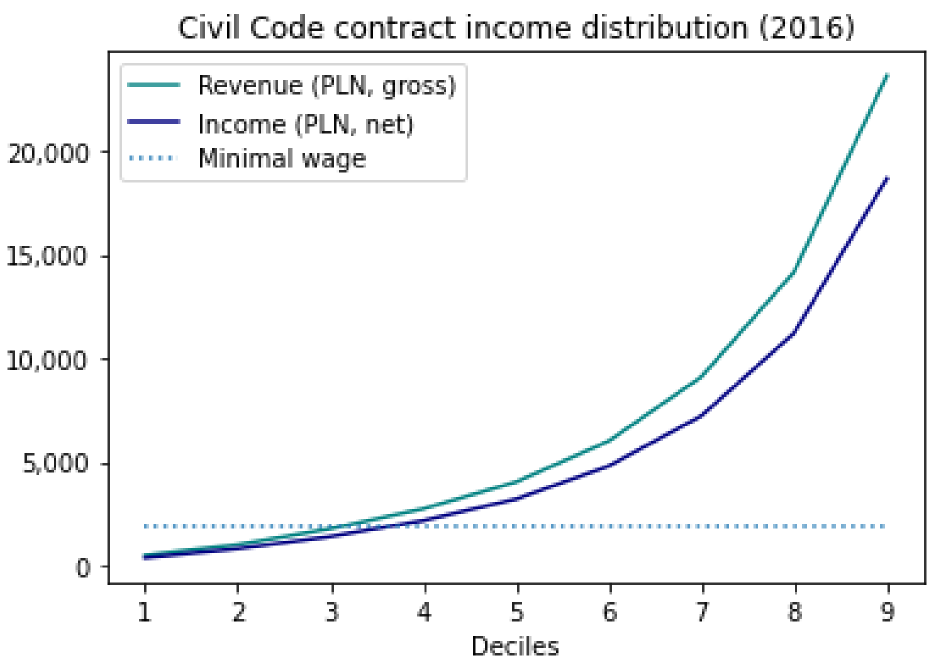
[3] As discussed by Chrostek et al. (2019), it is not straightforward to tell from the official data what the number of fictitious Labour Code-evading Civil Code-based contracts is. The figures in Table 2 report on the number of individuals who for a given number of months in one year signed contracts with wages that did not differ from the yearly mean more than the given percentage.

As noted by the Legislator, some of the Civil Code contract-based workers had been offered significantly lower salaries than the minimal wage guaranteed by the Labour Code (Sejm Rzeczypospolitej Polskiej, 2016, Uzasadnienie). The substitution of employment contracts with Civil Code ones became a malpractice used to evade the Labour Code and limit the costs of employment. Thus, in 2016, the Sejm of the Republic of Poland passed a bill which banned wages lower than PLN 12 per hour of work, regardless of the legal form of the contract between the worker and employer (ibid.). The reform was designed to equalise the minimal wage protection between different classes of contract holders, including occasional, part-time and temporary workers. However, it did not concern non-pecuniary provisions of contracts not specified in the Labour Code. Thus, the reform increased the wages of only those workers who earned less than PLN 12 per hour and did not hold a standard employment contract.

3.2. Treatment group characteristics

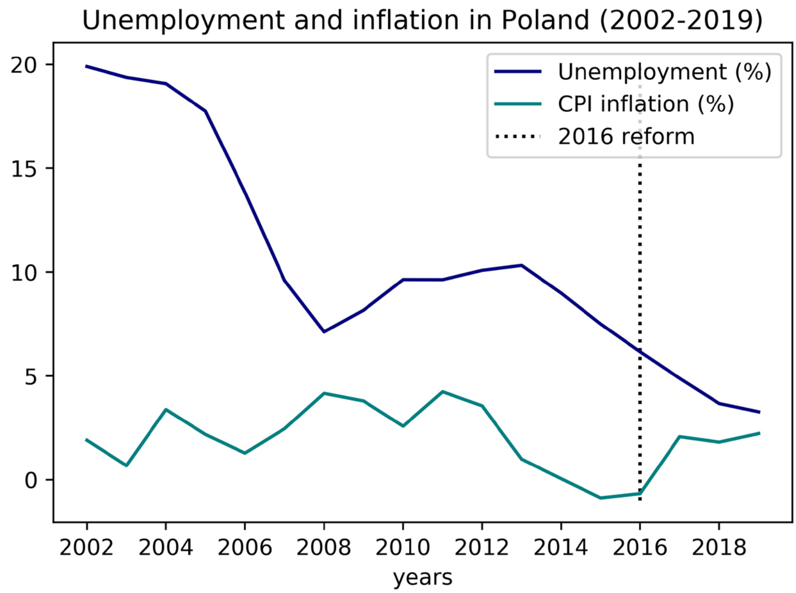
The 2016 minimal wage reform covered individuals forming the lowest-earning subset of the Civil Code contract holders. Out of all, only those whose earnings fell below the minimal wage in 2016 (i.e. PLN 1,850 per month or, equivalently, PLN 12 per hour) were subject to the reform-induced pay rise. As shown by Chrostek et al. (2019), they might have represented up to 30% of the total number of Civil Code contract holders (see Figure 1).

Figure 1. Income distribution in Poland (2016) from Civil Code contracts



Source: Chrostek et al. (2019).

Figure 2. Rates of unemployment and inflation in Poland (2002–2019)



Source: World Bank.

The assumption of a random, exogenous selection into the 2016 reform treatment group is, arguably, not satisfied. Given the outstandingly low unemployment in Poland in 2016 (see Figure 2) and the fact that, as shown by Statistics Poland (Główny Urząd Statystyczny [GUS], 2018b), median monthly salaries in the elementary occupations sector reached almost PLN 2,500 (in comparison to the PLN 1,850 threshold of the reform), it should be expected that the treatment group consisted of the most vulnerable individuals with the weakest bargaining position in the labour market. Hence, the selection into this treatment group is likely to have been correlated with low education, low skills and particular occupations (menial, repetitive, physical jobs).

Endogenous selection into the treatment group demands particular attention to the risk of the omitted variable bias. More specifically, some factors could be correlated both with the subjective satisfaction with the government and the probability of being in the treatment group. For example, people with high education might be in general more critical towards the government, while also significantly less exposed to minimal wage-earning jobs. Not accounting for that would lead to the overestimation of the reform's effect on the satisfaction with the government.

Another issue impeding empirical identification is simultaneity. Any factor influencing the government's popularity among voters, if introduced simultaneously to the treatment of interest, may be erroneously interpreted as an effect of the minimal wage reform (if it is not specifically accounted for). Actually, in 2016 another welfare transfer (a child benefit of PLN 500 monthly per child[4]) was implemented (Ustawa z dnia 11 lutego 2016 r. o pomocy państwa w wychowywaniu dzieci), whose effect must be included in the empirical analysis.

However, the 2016 reform provides a favourable opportunity to study the effect of an individual-level income shock on satisfaction with the government for two reasons. Firstly, once the observable characteristics of workers earning less than PLN 12 per hour under a Civil Code-based contract are accounted for, the treatment remains uncorrelated with individual support for government or any unobservable psychological traits. It is impossible to raise minimal wages of only those who have a particularly positive attitude towards the government. Thus, the reform may be considered a conditionally exogenous shock on a treatment group with certain observable characteristics. Secondly, remaining in or exiting the treatment group does not depend on the individual decision at the ballot box after the introduction of the reform. In other words, exposure to the effects of the reform in the years following 2016 did not depend on one's political predilections. As discussed in Farré et al. (2015)[5], widespread events such as sector collapses or factory closures, due to their exogenous character and independence from individual choices, might prove useful in retrieving particular causal effects of interest.

It is also worth mentioning that the general class of Civil Code contract holders obviously does not constitute a homogenous group partly due to the scale of Labour Code evasion: estimates show that 1 out of 5 Civil Code contracts may be in fact fraudulent (Arak et al., 2014). Low social security contributions attract workers of different occupations and education levels, including high-skilled experts such as researchers, journalists or IT developers. According to a survey by Sedlak&Sedlak, 70% of respondents would willingly give up a Labour Code employment contract in exchange for a higher salary.

4. The dataset

4.1. European Social Survey

This study uses individual-level data from the European Social Survey (ESS; rounds 3 to 9). The survey is conducted by the European Commission's ESS European Research Infrastructure every two years. Altogether, the sample consists of 15,624 individual

[4] For details see Section 4.3.2.

[5] Farré et al. (2015) use the Spanish 2007 construction sector collapse as an instrument for unemployment in their study of the joblessness in connection with mental health issues. They argue for their instrument validity on the grounds that it 'pushes individuals into unemployment irrespective of their unobserved [mental health, note by the Author] characteristics'.

records for Poland and is representative[6] with respect to age, gender, education and region.

The sample used has been restricted to the years 2006–2018, because since 2005, the political system in Poland shows strong patterns of bipartisanship (for details see Table 3). This allows a clear identification of the polarised voters' sentiments. On the other hand, since 2020, the COVID-19 pandemic has had a tremendous impact on government popularity surveys. Such a confounding factor could adversely affect the reliability of statistical inference.

The ESS dataset has been expanded to include yearly macroeconomic variables, i.e. GDP growth rate, unemployment rate and CPI inflation. The macroeconomic data were sourced from the World Bank Economic Outlook.

Due to the apparently high rotation, the ESS does not effectively constitute a panel. Approximately a third of the respondents appear in the dataset only once. Furthermore, rotation significantly increases in the final rounds (corresponding to years 2014–2018, see Figure 3).

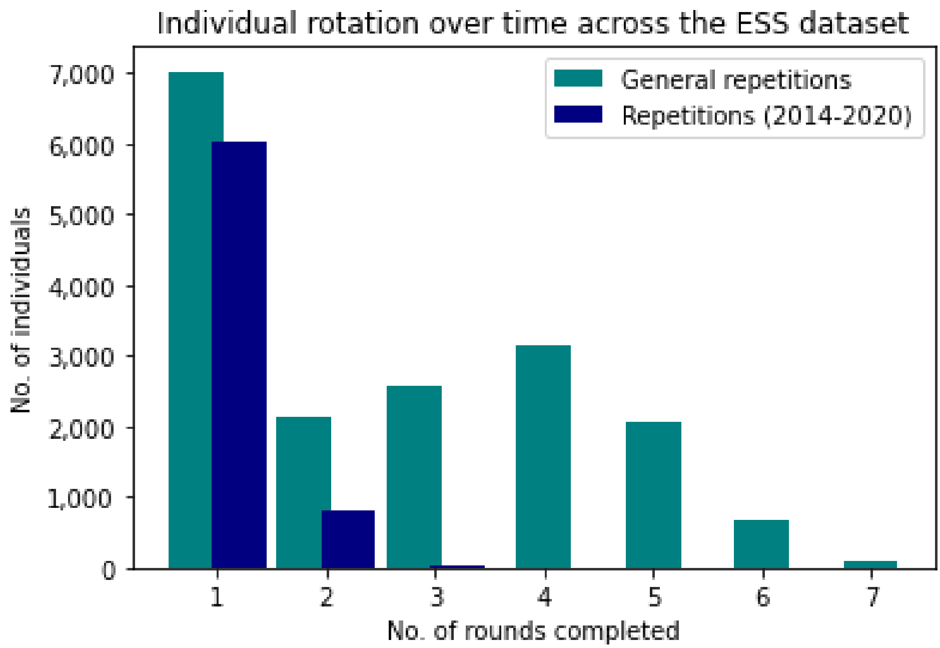
Table 3. Governing parties in Poland (2005–2019)

Parliamentary term	Years	Govt. leading party	Allies
V	2005–2007	Law and Justice (PiS)	Self-Defence (Samoobrona), League of Polish Families (LPR)
VI	2007–2011	Civic Platform (PO)	Polish People's Party (PSL)
VII	2011–2015	Civic Platform (PO)	Polish People's Party (PSL)
VIII	2015–2019	Law and Justice (PiS)	Agreement (Porozumienie), Solidarity Poland (SP)

Source: author's work.

[6] Representative, statistically robust results are obtained after weighting the data. Respective weights are provided by the ESS.

Figure 3. Rates of unemployment and inflation in Poland (2002–2019)



Source: World Bank.

4.2. Treatment group identification

The proper identification of the treatment group is the key empirical issue of this paper. As discussed in Sections 1 and 3, the minimal wage reform affected individuals only if two conditions were satisfied simultaneously: holding a Civil Code-based contract and earning less than PLN 12 per hour. However, neither of those conditions is reported directly in the ESS data, which necessitates an indirect, yet robust identification strategy.

The participants of the ESS are not asked about the legal form of their employment. However, the ESS Panel F provides sufficient information to develop an approximate non-Labour Code contract dummy. In particular, the respondents are asked the following questions:

1. **(F21)** In your main job are/were you:
   a) an employee
   b) self-employed
   c) working for your own family business
   d) refusal/don't know;
2. **(F22)** *(If self-employed in F21)* How many employees do you/did you have?;
3. **(F23)** *(If **not** self-employed in F21)* Do/did you have a work contract for:
   e) unlimited duration
   f) limited duration

g) no contract

h) refusal/don't know.

Based on the responses, Civil Code-based contract holders may be identified as those who either are self-employed with no employees or who are employees with a contract of limited duration[7] or no contract. Individuals with no contract are included due to the fact that, as pointed out by Chrostek et al. (2019), employers often offered their workers Civil Code contracts with low fixed salaries, while the majority of the actual wages was paid without any notice in the books. Thus, their income was directly increased by the reform, even if its main part did not come from a Civil Code-based contract.

Table 4. Deciles of monthly net and gross income distribution in Poland in 2016

Decile/Decile group	Net		Gross given by Statistics Poland
	ESS	HBS[a]	
	in PLN		
1	<= 1,400	1,375.88	1,890.32
2	1,401–1,900	1,840.00	2,279.31
3	1,901–2,400	2,320.00	2,673.49
4	2,401–2,900	2,812.69	3,070.00
5	2,901–3,400	3,301.50	3,510.67
6	3,401–4,000	3,873.90	4,000.00
7	4,001–4,700	4,521.50	4,583.33
8	4,701–5,600	5,414.00	5,444.88
9	5,601–7,100	6,880.00	7,200.00
10	>7,100		

a Household Budget Survey.

Source: author's work based on the ESS (2018), Household Budget Survey and Statistics Poland data (GUS, 2018a).

As mentioned in Section 3, holding a Civil Code contract itself is not enough to be classified into treatment. Identification must take into consideration not only the legal form of the held contract, but also the earnings. ESS Panel G provides the most accurate information on that (G9a, *What is your usual weekly/monthly/annual gross pay before tax and compulsory deductions?*); unfortunately, Panel G is a rotating panel included in rounds 2, 5 and 9 only. Hence, two alternative measures of income are proposed: a subjective poverty dummy and a decile poverty dummy.

1. **(Subjective poverty)** This dummy takes the value of 1 if the respondent finds it difficult or very difficult to cope on their present income. The dummy is coded on the basis of **(F42)**: *Which of the descriptions on this card comes closest to how you feel about your household's income nowadays?*

[7] Polish Labour Code generally does not allow an employment relation to last longer than 33 months based on limited duration contracts. A limited duration contract cannot be renewed more than twice. See Ustawa z dnia 26 czerwca 1974 r. – Kodeks pracy, art. 25.1.

a) *living comfortably on present income*
b) *coping on present income*
c) *finding it difficult to cope on present income*
d) *finding it very difficult to cope on present income*;

2. **(Decile poverty)** This dummy takes the value of 1 if the respondent falls into a given income decile group. The dummy is coded on the basis of **(F41)**: *Using this card, please tell me which letter describes your household's total income, after tax and compulsory deductions, from all sources?* The response card gives income decile ranges (see Table 4). The income brackets applied by the ESS have been sourced from the Household Budget Survey (HBS; Pol. Badanie Budżetów Gospodarstw Domowych, BBGD). Table 4 compares those net figures with the gross estimates provided by Statistics Poland.

4.3. Timing issues

The ESS dataset does not include information about the exact date of the respondent interview. The only data available are about the ESS round and equivalent year. The following question thus arises: should the year 2016 be treated as pre– or post–treatment? The reformed minimal salary regulation came into effect on 17th August 2016[8] (Ustawa z dnia 22 lipca 2016 r. o zmianie ustawy o minimalnym wynagrodzeniu za pracę oraz niektórych innych ustaw), which means that the last five months of 2016 were affected by the reform, while the first seven were not. Eventually, the decision was to interpret 2016 as post–reform, as the reform had been heavily discussed even before[9] its full implementation, thus affecting satisfaction with the government.

Finally, one must deal with the simultaneity problem posed by the fact that in 2016 – simultaneously with the minimal wage reform – the Family 500+ (Pol. Rodzina 500 Plus) transfer package was introduced. It offered a monthly transfer of PLN 500 per each but the oldest underage child in families having two or more children, and for the first (or only) child under certain income criteria (families could apply for the benefit for the first (or only) child if the net income per household member did not exceed 800 PLN) and it came into effect on 1st April 2016. Not accounting for that particular programme would lead to the overestimation of the impact of the minimal wage on government popularity due to the simultaneous timing.

ESS does not offer direct information about the amount of transfers each respondent receives from that programme. Thus, its effect is measured indirectly, as the number

[8] The official date of the reform implementation was 1st January 2017, but particular articles of the bill (increasing the minimal hourly wage) came into effect earlier, on 17th August 2016 (Ustawa z dnia 22 lipca 2016 r. o zmianie ustawy o minimalnym wynagrodzeniu...).

[9] The reform was promised in the 2015 expose of PM Beata Szydło, and the draft of the bill was passed to the Parliament as early as 6th June 2016.

of children entitled to the benefit. For the years 2016 and 2018 (ESS rounds 8 and 9), for every respondent, the number of children aged 18 or less has been calculated. The number of children entitled to the benefit is the total number of children minus 1 (unless the respondent reports being in the first decile of income distribution).

5. Regression analysis

5.1. Experiment design

The benchmark model used to estimate the extent to which the 2016 reform affected the satisfaction with the government is a DiD linear probability model (LPM) in the following form:

$$satgovt_{i,t} = \alpha + \beta_{treat}\mathrm{I}_{treat,i} + \beta_{post}\mathrm{I}_{post,t} + \beta_{DiD}\mathrm{I}_{treat,i}\mathrm{I}_{post,t} + \gamma P_t + \\ + \delta X_{i,t} + \varsigma E_t + \varepsilon_{i,t}.$$

The dependent variable, $satgovt_{i,t}$, is founded on the **B29** ESS question (*Now thinking about the [country] government, how satisfied are you with the way it is doing its job?*). The survey participants' answers were based on a 0–10 scale, where 0 meant 'extremely dissatisfied' and 1 meant 'extremely satisfied'. Thus, $satgovt_{i,t} = 1$ if the respondent selects 6 or higher.

Treatment indicator $\mathrm{I}_{treat,i}$ and post-reform indicator $\mathrm{I}_{post,t}$ are defined as shown in the previous section.

P_t represents political controls and responds to the bipartisan character of the Polish politics after 2005. It takes the value of 1 in the years when PiS was in power and 0 when PO was the governing party. Some sources in the literature suggest including not only the political, but also cultural factors (e.g. individual satisfaction with public services such as healthcare or education) in the models of satisfaction with the government (see Christensen & Lægreid, 2005). This approach comes from the distinction between the concepts of a specific and diffuse political support by Easton (1965). He argues that voters distinguish between general support for the public institutions and specific support rooting from their individual interactions and experiences with public services (see Christensen et al., 2020). However, Christensen and Lægreid (2005) show that those concepts are difficult to disentangle, as individuals who generally trust the government tend to also be satisfied with particular services provided by the authorities. Arguably, this effect could be further strengthened by the growing political polarisation in Poland. Consequently, variables measuring individual satisfaction with public services have been excluded from the list of the potential political controls.

$X_{i,t}$ represents the vector of individual controls which should guarantee conditional exogeneity of the selection into the treatment group. It was assembled in line with the literature, especially with the assertions of Liberini et al. (2017), who also use the DiD method. It includes age (linear and squared), gender, highest education attainment indicator and unemployment dummies (differentiated for those actively looking for a job and those not). Unlike in Liberini et al., however, our vector of individual controls does not include log of income due to the collinearity with the treatment effect.

Finally, E_t is an array of macroeconomic variables: aggregate output growth, unemployment rate and CPI inflation. All the explanatory variables are summarised in Table 5. Altogether, the variables used in this study represent a notion – well-rooted in the economic voting literature – that individual satisfaction with the government depends both on the soundness of the general economy and on individual welfare measures. Furthermore, variable selection stems from the expectation that non-economic factors, either socio-demographic or cultural, constitute an insightful complement to the purely economic ones.

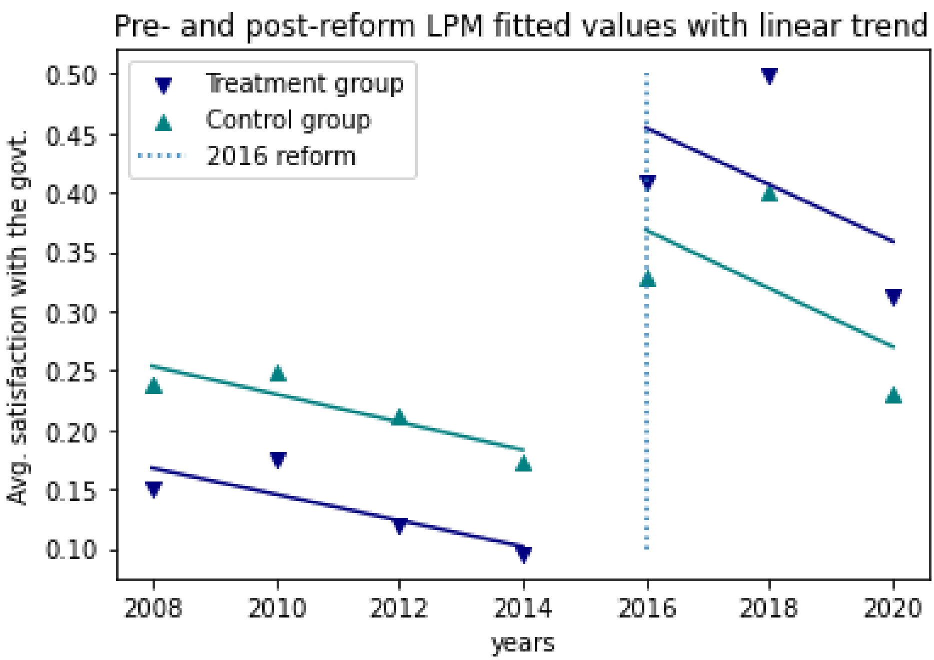
Table 5. Explanatory variables used in the study

Type	Variable	Description
Diff-in-diff operator	$\mathrm{I}_{treat,i}$	Treatment group indicator (=1 if treated)
Diff-in-diff operator	$\mathrm{I}_{post,t}$	Time indicator (=1 in 2016 or later)
Political controls	P_t	Governing party indicator (=1 if the PiS party is in power)
Individual socio-economic controls	$i.childbenef$	Number of children in the household who are entitled to the Family 500+ benefit
Individual socio-economic controls	$i.edulvla$	Highest educational attainment
Individual socio-economic controls	$uempla$	Unemployment indicator (=1 if unemployed)
Individual socio-economic controls	$uempli$	Economic activity indicator (=1 if unemployed and not actively looking for a job)
Individual socio-economic controls	$age, agesq$	Age (linear and squared)
Individual socio-economic controls	$gndr$	Gender indicator
Macroeconomic controls	$gdpgwth$	Real GDP *per capita* annual growth rate
Macroeconomic controls	$unempPL$	Unemployment rate
Macroeconomic controls	cpi	CPI inflation annual rate

Source: author's work.

The impact of the reform is studied with DiD, which is a standard policy assessment method in applied econometrics (see Angrist & Pischke, 2009). The core assumption underlying DiD applicability is the common trends assumption. DiD requires the control group to be a good counterfactual analogue of the treatment group, i.e. both groups – once controlled for socio-economic confounders – must follow parallel trends. Some authors, such as Kahn-Lang and Lang (2018) argue that DiD not only requires parallel trends between control and treatment groups, but also comparable levels. Nevertheless, both the assumptions are satisfied as presented in Figure 4, which clearly shows that both studied groups exhibit similar levels of satisfaction with the government and that their respective satisfaction metrics follow parallel trends. Arguably, the control group may be considered an accurate, counterfactual analogue of the treatment group.

Figure 4. Pre- and post-reform fitted values from LPM with controls



Note. The vertical axis represents the predicted mean probability of being satisfied with the government.
Source: author's work.

Under the conditional independence assumption, the LPM delivers unbiased, consistent estimates of the regressors' marginal effects. Linear probability regressions are estimated with the weighted least squares method with ESS-provided post-stratification weights (ESS, 2014).

5.2. Robustness checks

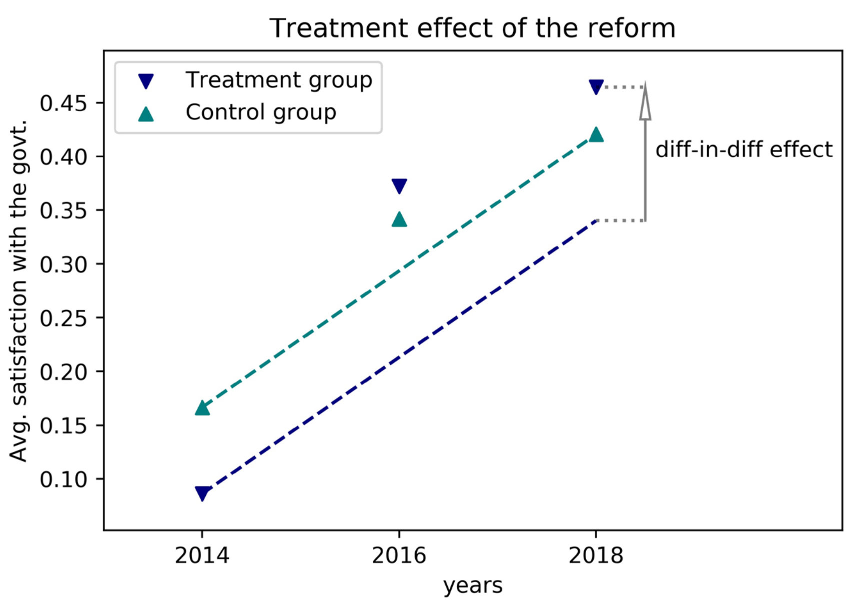
As a means of robustness checks, after the baseline DiD is estimated, controls and time-fixed effects are added to the benchmark model specification. In addition, binomial and multinomial discrete choice logistic models are fitted, and pooled and fixed effects panel models are introduced. Finally, alternative treatment identification techniques (subjective poverty indicator instead of decile poverty) are employed.

5.3. Results

Selected results are presented in Table 6. Statistical significance is assessed with respect to robust standard errors.

The DiD assessment of the reform's impact on individual, subjective satisfaction with the government is positive and statistically significant (see also Figures 4 and 5). As shown in Figure 4, in the pre-reform years, individuals in the treatment group had been on average less likely to be satisfied with the government; from 2016, however, the situation changed, and consequently those treated displayed a much higher probability of being satisfied with the government. This remains true for both the linear probability and the logit model. Only in the panel regression with individual fixed effects and year dummies, the reform's effect – despite the highest point estimate of all models – loses statistical significance; nevertheless, the *p*-value of almost 0.2 does not allow this impact to be altogether ignored. Furthermore, panel regression credibility might be questioned due to high in-sample rotation over time.

Figure 5. Graphical assessment of the treatment effect



Note. The vertical axis represents the predicted mean probability of being satisfied with the government.
Source: author's work.

The LPM, which gives unbiased and consistent estimates of the marginal effects *ceteris paribus*, concludes that the reform is related to an almost 15% increase in the probability that a given individual will be satisfied with the government. Thus, the effect of the reform on the popularity of the government is stronger than of any macro-economic variable considered. The only factors that seem to have comparable effects to the reform is the Family 500+ benefit in the case of three or more children. Significant errors related to some of the high-order Family 500+ coefficients might be related to the low number of the respective observations: there are only 90 recipients of the benefit for three children, 20 for four children and only five for five or more children.

Table 6. Estimation results (the p-values are reported in brackets)

Method dep. var	WLS (coef. reported)			WLogit (OR reported)			FE (coef. reported)
	$satgovt_{i,t}$						
I_{treat}	−0.0743 (0.002)	−0.088 (0)	−0.088 (0)	0.581 (0.010)	0.518 (0.002)	0.518 (0.002)	−0.060 (0.038)
I_{post}	0.120 (0)	0.643 (0)	0.167 (0)	1.871 (0)	44.691 (0)	2.628 (0)	0.266 (0)
I_{DiD}	0.142 (.043)	0.147 (0.031)	0.148 (0.031)	2.308 (0.016)	2.52 (0.002)	2.52 (0.008)	0.171 (0.199)
500+ (1)		−0.059 (0.053)	−0.059 (0.053)		0.763 (0.100)	0.764 (0.100)	
500+ (2)		0.024 (0.547)	0.024 (0.547)		1.161 (0.417)	1.161 (0.417)	
500+ (3)		0.143 (0.073)	0.143 (0.073)		1.915 (0.047)	1.916 (0.047)	
500+ (4)		0.294 (0.192)	0.294 (0.192)		3.546 (0.178)	3.546 (0.178)	
500+ (5)		0.699 (0)	0.699 (0)				
U_{act}		−0.056 (0.001)	−0.056 (0.001)		0.65 (0.002)	0.65 (0.002)	
U_{inact}		0.028 (0.321)	0.028 (0.321)		1.18 (0.316)	1.18 (0.316)	
GDP_t		0.049 (0)			1.34 (0)		
U_t		0.036 (0)			1.24 (0)		
CPI_t		0.021 (0)			1.145 (0)		
$X_{i,t}$		yes	yes		yes	yes	
T_t			yes			yes	yes
FE							yes
R^2	0.013	0.04	0.04	0.012	0.036	0.036	
obs. no	10,298	10,274	10,274	10,298	10,273	10,273	11,798

Source: author's work.

Interestingly, the variable responsible for the bipartisan system characteristics takes a negative value when PiS is in power (–36% with null p-value), which implies that the reform-induced support does not align with the general popularity of the governing party (in this case with the PiS party).

The positive coefficients on inflation and the general unemployment, however, are theoretically compelling. The positive impact of inflation on the satisfaction with the government could be explained with the CPI procyclical behaviour, which is a standard result in New Keynesian economics (for theory on the NK Phillips Curve, see Roberts (1995)). Justifying the positive coefficient on the general unemployment is, however, more difficult. Possibly, it can be explained by the relatively short sample in the model (seven periods only), which does not provide enough variability to correctly assess the impact of the unemployment.[10]

The logistic regression results confirm those of the LPM. The reported odds ratios show that there are approximately 2.5 times higher odds that an individual treated by the 2016 reform is satisfied with the government.

Finally, the panel regression with individual and time-fixed effects provides the most robust matching, as it is able to deal with all the unobserved, individual-level heterogeneity through fixed effects. The panel model also reports positive effects of the treatment on the satisfaction with the government. However, precise matching leads to higher error associated with the coefficient of interest, which might imply that the significance of the reform could have been overestimated in the previous methods.

6. Conclusions

The difference-in-differences analysis of the Polish 2016 minimal hourly wage reform effect on satisfaction with the government provides robust evidence that those treated are on average more satisfied with the government *ceteris paribus*. The effect of the reform-induced individual-level positive income shock is stronger than the impact of any other macroeconomic variable. This result supports the findings of Ward (2019), who claims that individual subjective happiness measures determine a higher fraction of the share of government vote than the macroeconomic factors do.

In line with the study by Liberini et al. (2017), this paper provides evidence for treatment analysis usefulness in the individual-level economic voting research. Finally, this paper develops a detailed insight into the recent labour market policies adopted in Poland, along with precise methods of identifying the affected groups. The ESS-based identification methods discussed above may be employed in further research of the public policy in Poland. In particular, investigating specific political preferences instead of general satisfaction with the government could shed light on the intricacies of the electoral dynamics and motivations. Furthermore, taking into account the role of satisfaction with particular public services (such as healthcare or public education, both reported in the ESS) could resolve whether improvement in the state-provided services is a necessary condition for increasing satisfaction with the government or if individual welfare growth suffices.

[10] Since general unemployment is individually-invariant, in absence of the explicit time effects, it might capture some residual components not captured by the other variables.

The identification method proposed in this study is deeply rooted in the realm of the Polish economy and politics. Nevertheless, one should expect its findings on the patterns of economic voting to be readily generalisable to other democratic states due to the method used as shown in the vast literature describing natural experiments and the DiD approach used to draw general inference from particular cases (as in the famous study of the impact of minimum wage increases on unemployment by Card and Krueger (1994). Arguably, during dynamic macroeconomic growth, targeted reforms tackling wages of low-income workers cause them to be satisfied with the government even more than those earning high wages, who can participate more actively in the general economic growth.

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