

Explaining voter turnout: A review of aggregate-level research

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Abstract

The amount of scholarly attention directed at resolving the question why people turn out to cast a vote is vast. In a research field dominated by empirical studies — such as the one on voter turnout — an overview of where we stand and what we know is not superfluous. Therefore, the present paper reviews and assesses the empirical evidence brought forward through a meta-analysis of 83 aggregate-level studies. We thereby concentrate on the effect of socio-economic, political and institutional variables. The results argue for the introduction of a ‘core’ model of voter turnout — including, among other elements, population size and election closeness — that can be used as a starting point for extending our knowledge on why people vote.

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1. Introduction

Why do people turn out on Election Day? This question has spawned an enormous amount of scholarly attention, theoretically as well as empirically. The present paper provides an assessment of the empirical work (for reviews of the theoretical literature, see Aldrich, 1993; Dhillon and Peralta, 2002). We have limited our scope to that part of the literature that uses

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aggregate-level data (hence disregarding individual-level and experimental studies). Specifically, we take into account the estimation results from 83 studies where the dependent variable is voter turnout (or absenteeism) measured at the district, municipality, state or country level.¹ The reason for this focus on aggregate-level empirical work is that, at this level, ‘individual idiosyncrasies cancel each other [out]’ (Matsusaka and Palda, 1999, 442).

We employ meta-analytic research procedures to assess whether or not an independent variable has an impact on the dependent variable (i.e. voter turnout). As such, it is important to realize that we do not have the intention to fully account for every result obtained in every study. The issue rather is to ‘draw out general patterns from a wide variety of empirical sources’ (Imbeau et al., 2001, 3). The results of this analysis – we hope – constitute a starting point for scholars in the field to engage in further investigation of previously neglected or unresolved issues.

The remainder of the paper is structured as follows. We start in Section 2 with an overview of how turnout is defined in aggregate-level studies. Given the heterogeneity observed in the operationalisation of the dependent variable, this enquiry is by no means redundant. Section 3 presents the methodology applied in this study and Section 4 reviews the effects on voter turnout of three sets of independent variables: socio-economic, political and institutional variables. Section 5 concludes.

2. The dependent variable: turnout defined

Defining ‘turnout’ as the absolute number of people voting in the election or as the share of the population that has cast its vote is obviously correct. However, it is not necessarily complete. When ‘turnout’ is defined as a share of ‘the population’, a clear operationalisation of this population variable is also needed. Did one take the ratio of the number of voters to the entire population, to the population of voting age, to the eligible population or to the number of people registered to vote? This affects the size of – and quite likely also the variation in – turnout rates and thus may affect the estimation results. Hence, the question is much less trivial than it at first appears and should receive the attention due to it (see also Endersby et al., 2002).

Information on the turnout variable provided in the 83 aggregate-level studies we review is summarized in Table 1. We present the different definitions employed throughout our sample and the frequency with which they appear. Appendix A provides a more general table relating each paper to the definition of turnout used. Note that the total number of entries in Table 1 exceeds 83 as some studies use several definitions of turnout (e.g. Filer and Kenny, 1980; Matsusaka, 1993).

Barely three studies look at the absolute level of votes cast as their measure of turnout (Chapman and Palda, 1983; Lutz, 1991; Denver and Halfacree, 1992). It emerges that an overwhelming majority of the analyses define turnout as some sort of ratio.² In such cases, a clear and complete definition of both the numerator and denominator is needed. However, no less

¹ A table with the 83 papers in this review can be found in Appendix A. Table A.1 contains the general reference of the paper, its sample and the definition of the turnout variable. To minimize the well-known bias towards over-reporting of statistically significant results in published studies (the ‘file-drawer problem’, see e.g. Coursol and Wagner, 1986; Begg, 1994), a number of pertinent unpublished works were also included in the analysis (cf. Lau et al., 1999).

² Defining turnout as a ratio limits the range of this variable to the 0–100% interval. Using simple OLS estimation may lead to predictions outside this range. To avoid this, a logistic transformation is required in which the dependent variable is $\ln(\text{turnout}/(100-\text{turnout}))$ (Thomas, 1997). The problem is most forceful when turnout rates approach the boundaries of the interval (Mattila, 2002). This is rarely the case in reality such that OLS usually provides a tolerable approximation.

Table 1
 ‘Turnout’ defined in 83 aggregate-level empirical analyses

Definition	Frequency
Absolute number of votes cast	3
Number voted/voting age population	36
Number voted/number of eligible voters	13
Number voted/number registered	23
Number voted/size of electorate	2
No clear reference given	10

than 12% (10 out of 83) of the analyses in our sample fail to provide this information! Though it can in each case be easily recognized that voter turnout is defined as the ratio of the number of votes cast (the numerator common to almost all turnout studies) to some population measure, the precise definition in the denominator is unclear. The remaining studies can be subdivided into three groups.

First of all, 36 studies divide the number of voters by the *population of voting age* (the ‘age-eligible’ population). The denominator thus leaves out those that have not yet reached the age at which one is legally allowed – or in some cases obliged – to vote (18 years in most Western countries). Most likely, the frequent use of this ratio is due to the ease with which it can be obtained (or calculated) from official statistics. Secondly, 13 studies regard only that part of the population that is *eligible to vote*. This not only disregards individuals under the legal voting age, but also those who lost their civic rights due to, say, a criminal conviction or who are placed in a prolonged state of immaturity, and so on. Finally, 23 studies use the number of people *registered to vote* (this includes Rosenthal and Sen, 1973; Perea, 2000 who use abstention rather than turnout rates as dependent variable). To what degree this differs from the eligible population may be a point of discussion. Clearly one should be registered to be eligible to vote and to be able to register, one must fulfil all other elements of eligibility (e.g. age, civic rights). However, it seems worthwhile to make a distinction as in some countries people are free to register (e.g. United States) while in others they are legally obliged to do so (e.g. Australia) or the government assumes responsibility for the registration process (e.g. Belgium). Hence, non-registration may be a political choice in some countries in which case non-registrants should also be accounted for in the turnout rate investigated.³

It is hard to say which operationalisation of the turnout rate is ‘best’. Obviously, excluding those legally forbidden to vote should be preferred, as their inclusion will unnecessarily depress turnout rates. Moreover, variation in the number of these persons over time and/or space may bias the estimation results. As such, eligible population may be more appropriate than voting age population. The choice to incorporate or leave aside voluntary non-registrants (where this is possible) is harder to make. As already mentioned, non-registration *may* be a political choice related to the turnout decision. In reality, preference of one ratio over the other is often guided by data availability. American studies, for example, are often forced to use voting age population instead of registered voters if they want to compile a nation-wide dataset. The reason is that some states do not report or require pre-election registration. Foster (1984) reports that for the period 1968–80 up to eight states would have to be dropped from the sample in some years for this reason. Nonetheless, clarity about the precise definitions is fundamental.

³ Note that we did not categorise the two studies using ‘size electorate’. The reason is that ‘electorate’ is rather vague and may point to either of the other categories.

3. Data and methods

To assess the relationship between voter turnout and the explanatory factors brought forward in the literature, we make use of a number of meta-analytic research procedures. A ‘*meta-analysis* refers to the analysis of analyses’ (Glass, 1976, 3, original emphasis).⁴ The observations used in such an analysis are not derived directly from the original data but rather represent an estimate obtained using these original data. Thus, in a meta-analysis, we perform a statistical analysis on the test results brought forward in previous studies. Specifically, we employ two meta-analytic procedures known as the ‘vote-counting’ and ‘combined tests’ procedures (for a similar approach, see Imbeau et al., 2001).

The most commonly used procedure of integrating research studies is by ‘vote-counting’ procedures. It can be summarized as follows (Glass et al., 1981; Light and Smith, 1971; Hedges and Olkin, 1980). For each test of a given hypothesis, characterize the outcome of this test as a ‘success’ when the coefficient is significant in the predicted direction, a ‘failure’ when it is not significant and an ‘anomaly’ when it is significant in the wrong direction. Counting the number of tests in each of these three categories, the modal categorization is ‘assumed to give the best estimate of the direction of the true relationship between the independent and the dependent variable’ (Light and Smith, 1971, 443). Dividing the number of ‘successes’ by the total number of tests performed provides a measure for the success rate associated with a given hypothesis. The higher the success rate, the more confident we can be in having uncovered a ‘true’ association between the dependent and independent variable.

Looking at each test result separately may bias the results of the analysis if the distribution of the number of individual tests per study is highly skewed (Wolf, 1986; Imbeau et al., 2001). To resolve this issue, the same technique can be applied to the overall results of the studies (rather than the separate tests). This (implicitly) assigns a weight to each test result inverse to the number of tests performed in a study. In line with Imbeau et al. (2001), we report a study as a ‘success’ when a plurality of the tests performed in it significantly supports the prescribed hypothesis and a ‘failure’ when this is not the case. As above, the modal category is designated the best approximation of the true relation between the dependent and independent variable.

Admittedly, vote-counting procedures are not ideal for deciding whether or not to accept/reject a research hypothesis. It also does not allow an assessment of the size of the effect of a variable. A better way to achieve these aims would be to use the ‘combined tests’ technique (Wolf, 1986). This is based on the summation of the actual test statistics provided in each study. Given the inconsistencies in reporting these statistics across studies, we were prevented from using this method directly. Nonetheless, as shown in Imbeau et al. (2001, 15), ‘a simplified version of the ‘combined tests’ procedure based on vote-counting results’ can be employed ‘to calculate a proxy measure of average effect size’. To this end, we first calculate the approximate effect size r for each individual study by looking at the number of successes, failures and anomalies in the various tests in the study. Assigning a weight of 1, 0 and -1 to these, respectively, the effect size can be proxied by:

$$r = (\text{successes} - \text{anomalies}) / \text{number of tests}$$

⁴ An extensive review of the advantages and criticisms of meta-analyses is presented in Glass et al. (1981), Rosenthal (1984), Wolf (1986) and, more recently, Hunter and Schmidt (2004).

The effect size across all studies is then given by the average of the r s for each study (denoted by r_{av}). This metric gives the number of standard deviation units with which turnout is affected if the independent variable under consideration changes. By calculating a, say 95% confidence interval around this estimate, we can then judge whether or not there is a statistically significant effect on the dependent variable. A similar measure can be obtained by taking each test result separately instead of first summarizing over the test results within one study.

In the next section, we report the results for each of these measures in order to draw some general conclusions about the relation between the independent variables and electoral turnout (and their importance for further research in the field).

4. Analysis and findings

Numerous variables have been proposed in analyses of voter turnout. None of these, however, is omnipresent in the literature. This disagreement is partly due to the lack of a firm theoretical model at the basis of variable selection. A considerable amount of research tends to focus on the effect of just one variable or tests ‘some propositions about turnout’ (Hoffman-Martinot et al., 1996, 242).⁵ However, another explanation is that the results from various tests of the same hypothesis often seem to contradict each other or fail to reach statistical significance. The variables introduced (and hypotheses tested) thus do not seem imperative to our understanding of why people vote. Our analysis aims to discover whether we have not merely failed to recognize such imperative variables by judging their performance in the literature using the meta-analytic research techniques presented in the previous section.

We focus on the effects of three sets of variables: socio-economic (Section 4.1), political (Section 4.2) and institutional variables (Section 4.3). For each of these, the discussion is structured in roughly the same way. We first briefly present the theoretical arguments for including a given variable and then assess its empirical value. More background information with respect to the operationalisation of the variables considered is provided in Appendix A (Table A.2). Though the focus is on aggregate-level studies, we occasionally refer to evidence from individual-level and/or experimental studies to illustrate whether findings are compatible (or rather at odds) over the different levels of analysis.

4.1. Socio-economic variables

In this section, we start by casting a closer eye on five socio-economic variables that have been associated with voter turnout. In order of appearance, these are population size, population concentration, population stability, population homogeneity and previous turnout levels.⁶ The results for the various metrics employed are summarized in Table 2.

⁵ Exceptions include, among others, Barzel and Silberberg (1973), Silberman and Durden (1975) and Durden and Gaynor (1987) – who test Downs’ (1957) instrumental voter model – and Filer et al. (1993) and Lapp (1999) – who present tests of group-based models of turnout.

⁶ Based on the Resources Model of Participation (RMP, Verba and Nie, 1972), some scholars also include measures for age, education and income. These variables are disregarded in the present study. Importantly, interpretations with respect to socio-economic variables should be made with caution due to the potential ‘ecological fallacy’. Higher turnout in districts with, say, more homeowners does not necessarily imply that homeowners have a higher likelihood of voting. Importantly, however, King (1997) recently made a lucid and convincing argument on the admissibility of aggregate results for individual-level inference. Once proper estimation techniques and validity checks are satisfied, trustworthy ecological inferences become achievable.

Table 2
Results of meta-analysis for socio-economic variables

	Success	Failure	Anomaly	Success rate (%)	r_{av}
Population size					
Tests	67	43	10	55.83	0.48*
Studies	18	10	—	64.29	0.65*
Population concentration					
Tests	42	47	15	40.38	0.26*
Studies	11	14	—	44.00	0.26
Population stability					
Tests	146	20	29	74.87	0.60*
Studies	18	6	—	75.00	0.73*
Population homogeneity (income)					
Tests	6	13	13	18.75	−0.22
Studies	1	6	—	14.29	−0.27
Population homogeneity (ethnic)					
Tests	12	8	8	42.86	0.14
Studies	2	3	—	40.00	−0.03
Lagged turnout					
Tests	31	4	0	88.57	0.89*
Studies	7	1	—	87.50	0.71*

Note: * denotes statistical significance at better than the 5% level.

4.1.1. Population size

Theoretically, the inclusion of population size measures is suggested by the probability of casting the decisive vote in the election (i.e. making or breaking a tie). According to Downs' (1957) 'calculus-of-voting' model, voters are instrumentally rational. That is, they vote in order to change the outcome of the election and only incur the costs of voting if these do not outweigh the expected benefits of that action. These expected benefits increase with the expected difference between the (two) candidates in the election *and* with the probability of affecting the election result. The latter element — the probability of being decisive — is especially relevant here as it is influenced by how close one expects the race to be (see Section 4.2.1) and by the size of the population (Owen and Grofman, 1984; Mueller, 2003). Specifically, and intuitively apparent, the greater the size of the community, the smaller the probability becomes that one single voter will make a difference. This decreases the expected utility from voting and makes it more likely that one abstains. We therefore hypothesize a negative relation between population size and turnout rates.⁷

In spite of this clear theoretical prediction, only little more than one in three studies employs a population size variable (28 out of 83). These 28 studies perform 120 tests of the hypothesis (4.3 tests on average per study). Looking at the individual tests, we observe that 67 of these are successes, 43 are failures and 10 are anomalies. Since the 'success' category is the modal category, we find support for the hypothesis that a larger population is associated with lower electoral turnout. The same holds if we look at the level of the studies rather than the individual tests (18

⁷ Scholars predominantly use overall population size to estimate this effect. Nonetheless, in countries where elections are decided at the district level (such as the US), it may be judicious to also regard the district's population size. If constituencies are small, the voter may be influential at this level even though this constituency is nested within a much larger population. A similar argument holds for the closeness of the election (see Section 4.2.1). We thank a referee for pointing this out to us.

successes versus 10 failures). Importantly, the linear relationship specified by most analyses may not be optimal, as there can be very wide variation in population sizes across the sample. As such, it might be better to regard the (natural) logarithm of population size as is done in for example Filer and Kenny (1980), Hansen (1994), Blais and Dobrzynska (1998) and Allers (2000).

Turning to the size of the effect, we find that r_{av} equals 0.65 when we look at studies and 0.48 when regarding each test individually. This implies that a change in population size by one standard deviation reduces turnout with approximately 0.48–0.65 standard deviation units (Imbeau et al., 2001). Given that the 95% confidence interval around these estimates does not comprise 0, the proxy measure for average effect size is statistically significant. The results from this simplified version of the combined tests procedure thus support the conclusion from the vote-counting procedure. Population size has a statistically significant negative effect on turnout.⁸

4.1.2. Population concentration

Population concentration variables are often used as proxies for the differences between urban and rural areas. Inclusion in turnout-models is based on the sociological theory that urbanisation leads to ‘a weakening of interpersonal bonds, primary social structures and consensus on norms’ (Hoffman-Martinot, 1994, 14; Wirth, 1938). The argument holds that cities are more individualistic in nature such that there is less ‘social pressure’ to turn out and cast a vote in (densely populated) city communities. This ‘social pressure’ argument builds on the idea that voting is a civic duty, non-compliance with which results in a loss of social prestige or reputation for the individual (Riker and Ordeshook, 1968; Overbye, 1995). A second element is that politics in general, and elections more specifically, may be considered more personal in low-density areas (Blank, 1974; Davis, 1991). People are likely to know all candidates and what they stand for, thus lowering the information costs of turning out in these areas.⁹

There are 25 studies that include one of two population concentration measures: (a) the ratio of a population size measure to an area size measure and (b) the level of urbanisation (i.e. the share of the population living in urban areas). The results fail to support the idea that population concentration reduces turnout. Indeed, the modal category in Table 2 is ‘failure’ both when we look at the individual test results and the studies. The proxy of the average effect size r_{av} is such that a standard deviation increase in population concentration reduces turnout with approximately 0.26 standard deviation units. However, this is only (marginally) significant when we look at the test results and not while regarding the studies as such. We conclude that the relation between population concentration and voter turnout is weak.

It must be noted that some studies employ both types of measures in their analysis. Filer (1977) and Hoffman-Martinot et al. (1996) study turnout in more than one state/country and may lack similar information across the areas they study. The two measures thus appear in different estimations and are interpreted as measuring the same effect. Nonetheless, three studies include both definitions in the same regression equation (Preuss, 1981; Cox and Munger, 1989; Filer et al., 1993). This alludes to a slight difference in what is being measured.¹⁰ The latter idea

⁸ To the best of our knowledge, few studies using individual-level data address this issue. Whereas Matsusaka and Palda (1999) find an insignificant negative relation between community size and turnout in Canada, Oliver (2000, 361) concludes from US data that ‘people in larger cities are much less likely to (...) vote in local elections’.

⁹ Filer (1977), on the other hand, argues that mobilisation efforts are more efficient in crowded areas and less effort is needed for people to vote (e.g. smaller distance to the polls).

¹⁰ Possibly population per area is seen as a general population concentration measure while the level of urbanisation adds an extra dimension (viz the impersonality of the city, cf. Wirth, 1938).

is substantiated by the observation that both measures provide statistically significant explanations of turnout in these studies.

4.1.3. Population stability

From a theoretical perspective, population stability can be expected to increase turnout rates for three reasons. Firstly, a stable population increases feelings of identification and group solidarity (Hoffman-Martinot, 1994; Ashworth et al., 2002) and thereby ‘social pressure’ towards voting. Secondly, residing in the same area for longer periods of time tends to improve ones knowledge of local issues and candidates. This in turn decreases ones information costs of voting (Filer et al., 1993). Finally, higher (out)-migration may indicate higher non-voting as potential voters might live elsewhere in the near future and are unaffected by local policy.

Three measures have been used to estimate the effect of population stability on turnout: *population mobility* (the percentage of the population that has moved out of or toward a certain area), *population growth* (adds the number of births and subtracts the number of deaths from the previous measure) and *homeownership* (the percentage of owner–occupiers in the community). The idea behind the latter measure is that homeowners are more likely to reside in the same area for a longer period of time than renters – increasing population stability. The empirical results of the 24 studies that include population stability measures show that with only few exceptions, the theoretically expected positive relation between stability and turnout is statistically significant (the success rate lies above 70%). Moreover, the 95% confidence interval around the proxy of the average effect size ($r_{av} = 0.60$) does not contain 0. Both results hold when we look at the studies’ overall conclusions as well as at the individual test results. We conclude that population stability is an important determinant of voter turnout.¹¹

Note, however, that several studies include both a homeownership and a population mobility/growth measure. The reason is that homeownership may not only indicate longer residence in some area, but might also point to homeowners having a supplementary stake in elections (Filer et al., 1993; Hoffman-Martinot, 1994). This additional concern refers to the potential capital gains and losses from political outcomes that homeowners face and that are irrelevant to renters. Indeed, some political actions may decrease the value of land and houses, which is only important to those who own their home. A separate analysis for both groups of variables (homeownership and population mobility/growth) reveals that both elements are significantly related to voter turnout in the expected direction. Communities with a large share of the population owning their house are more likely to witness high turnout rates while more mobile (or growing) communities are confronted with lower turnout rates (results available upon request).

4.1.4. Population homogeneity

According to Cohen (1982, 259), ‘planners who are concerned with building communities (...) have accepted the fact that social homogeneity is a necessary prerequisite of community cohesion.’ As cohesion increases group solidarity (and ‘social pressure’), political participation in communities with a high degree of socio-economic, racial or ethnic *homogeneity* should be

¹¹ Denver (1995, 192) reviews individual-level research of non-voting in Britain and reports a ‘strong consensus’ contending that ‘turnout is (...) low among recent migrants (...) and those living in privately rented accommodation’. Schlozman (2002, 443) – reviewing individual-level research on political participation in America – argues that ‘indicators of community attachment as homeownership and length of residence (...) [are] consistently a powerful predictor of activity’. Estimates from Canadian data throughout the 1980s, however, are generally insignificant (Matsusaka and Palda, 1999).

higher than in areas where this is not the case. Zimmer (1976) instead proposes that *heterogeneity* increases turnout. The reason is that, when the government only performs redistributive actions (cf. the classic Meltzer–Richard model), the possible benefits of redistribution are largest for the group with the most political power. And voting is the way to increase the political power of one's group.

Barely 10 of the 83 studies withheld in this review have regarded the effect of population homogeneity. In these, heterogeneity is mostly operationalised through a Herfindahl–Hirschmann concentration index. This index was originally developed in industrial economics to measure concentration within an industry. It is defined as $H = \sum_{i=1}^n S_i^2$ where S_i represent the share of group i in the total community. The larger the index value, the more homogeneous a community is. Specific measures of income inequality – such as the Gini coefficient and the interquartile income difference – have also been introduced.¹²

Though this reduces the number of observations, we analysed measures of income inequality separately from those measuring ethnic heterogeneity. When regarding income inequality, 13 test results provide a significant negative sign compared to 6 significant positive and 13 insignificant ones. For the ethnic heterogeneity measures, we find 12 significant positive estimates, eight significant negative and another eight insignificant. Clearly, in both cases, neither the positive nor the negative signs present a plurality of the test results. Also, the estimated average effect (r_{av}) is never significantly different from 0, though it is mostly negative. Similar results are obtained when using income and ethnic homogeneity measures together in a single analysis. The results thus appear to be somewhat more in line with Zimmer's (1976) arguments rather than those of Cohen (1982), but overall the relation between population homogeneity and voter turnout appears to be rather weak.

Disregarded in the above analysis are 27 studies that include a variable measuring the presence of 'minority groups' or their share in the total population. Though this in some sense relates to the homogeneity of the population, we chose to regard this issue separately. Especially in studies on the US, the effect of race on electoral turnout has been frequently analysed to see whether blacks have de facto been disenfranchised. The empirical results tend to support the hypothesis that turnout is lower where the share of the minority in the population is higher (86 successes, 27 failures and 16 anomalies when regarding the individual test statistics).¹³ For instance, turnout rates tend to be lower in areas with a larger black community. The inference that black turnout is below white turnout suffers, however, from aggregation bias. Indeed, individual-level studies show that blacks are at least as likely to participate in elections than whites when one controls for demographic differences (see Bobo and Gilliam, 1990). Oberholzer-Gee and Waldfogel (2001) provide evidence that clarifies the discrepancy in individual- and aggregate-level results. Particularly, they show that an increased share of blacks increases

¹² The Gini coefficient is most easily calculated using the Lorenz curve diagram (this curve shows, for the bottom $x\%$ households, their share of the total income). Denoting the area between the line of perfect equality and the Lorenz curve by A and the area underneath the Lorenz curve by B , the Gini coefficient equals $A/(A+B)$. The interquartile income difference is measured as $100 \times (Q3 - Q1) / Me$, where $Q1$ is the income of the top of the first quartile (the poorer end); $Q3$ is the income for the top of the third quartile and Me is median income.

¹³ Lapp (1999) introduces five 'minority group' measures in her study on Canadian elections and finds that the effect on turnout is different for the various groups. Her attempt to relate this finding to differences in mobilisation efforts of community leaders is unsuccessful. Still, given that Greece has a system of compulsory voting, it is striking to see that the presence of a larger Greek community is associated with higher turnout rates while negative relations are predominant for the other groups (Jewish, Italian, Chinese and Portuguese).

black voter turnout while reducing white voter turnout (leading to an overall reduction in turnout when the share of blacks increases).

4.1.5. Previous turnout

Voting may be habit-forming. That is, people who voted in the past are more likely to repeat this action in future elections (and vice versa). This is especially likely when individuals are reinforced by the result of their action, viz. through the victory (or defeat) of their favoured candidate. This idea was – to the best of our knowledge – first brought forward by Bernard Grofman (quoted from personal communication in Wuffle, 1984). It is supported in recent individual-level empirical work (see Kanazawa, 2000; Green and Shachar, 2000; Plutzer, 2002; Gerber et al., 2003) and is at the basis of theoretical models of voter turnout based on the psychological concept of ‘adaptive’ or ‘reinforcement’ learning (see Sieg and Schulz, 1995; Kanazawa, 1998, 2000; Demichelis and Dhillon, 2002; Bendor et al., 2003; Fowler, 2004). This habit element in electoral turnout may imply that present turnout could to some extent be explained by past turnout.

Only 8 of the aggregate-level empirical studies in our sample have taken up this issue (providing 35 coefficient estimates). All but one of these studies reveals a statistically significant positive relation between past and present turnout rates (a success rate of 87.5%). The effect, both for studies and tests, is statistically significant. This provides strong supportive evidence of recent theoretical work in this direction.

4.2. Political variables

Let us now turn to the effect of political variables on electoral turnout. Two of these refer to the electoral race itself, viz. the closeness of the contest (Section 4.2.1) and the effect of campaign expenditures (Section 4.2.2). The third political variable refers to a specific characteristic of the political landscape, namely the level of political fragmentation (Section 4.2.3). The results are summarized in Table 3.

4.2.1. Closeness (or marginality)

As mentioned in Section 4.1.1, in rational theories of voting the expected benefit of voting is influenced by the probability of affecting the election result (i.e. making or breaking a tie). Besides population size, another relevant factor herein is the closeness of the election. The closer

Table 3
Results of meta-analysis for political variables

	Success	Failure	Anomaly	Success rate (%)	r_{av}
Closeness					
Tests	206	137	19	56.91	0.58*
Studies	36	16	–	69.23	0.69*
Campaign expenditures					
Tests	97	33	4	72.39	0.69*
Studies	17	3	–	85.00	0.79*
Political fragmentation					
Tests	25	23	27	33.33	–0.04
Studies	5	17	–	22.73	–0.31

Note: * denotes statistical significance at better than the 5% level.

the election is expected to be, the higher becomes the probability that one vote affects the outcome. This increases the expected utility of voting and thereby voter turnout. Matsusaka and Palda (1993) refer to this as the Downsian Closeness Hypothesis.

Cox and Munger (1989) and Kirchgässner and Schulz (2004) provide an alternative explanation for the same prediction. More precisely, they follow Key (1957) and Denver and Hands (1974) in arguing that close elections provoke more political elite mobilisation efforts. These increased campaign efforts, engaged in by the competing parties to tilt the balance in the appropriate direction, lead to higher turnout rates (see also Section 4.2.2). Though election closeness and turnout are in this reasoning still positively related, the observed effect is indirect (via differences in campaign efforts).

Closeness is by far the most analysed element in the turnout literature. More than half of the studies reviewed here (52 out of 83) include some closeness measure. They provide 362 estimates (or just under seven tests per study on average). The focus is predominantly on the closeness of the overall election outcome. Nonetheless, in countries where elections are decided at the district level (such as the US), ‘the closeness of the race *not only* matters in terms of the overall outcome *but also* at the district level’ (Franklin, 2004, 105, emphasis added). In other words, closer contests at the district level can be expected to increase voter turnout even if the overall result may not be that close (and vice versa) (see also Franklin and Evans, 2000).¹⁴

The (*percentage*) *vote gap* between the first and second candidate in the race has become somewhat the standard measure for the closeness of the race. Obviously, the smaller the gap is between these two parties, the closer the election and the higher turnout rates are expected to be. This prediction is supported in a majority of the empirical tests (206 successes versus 137 failures and 19 anomalies) and studies (36 successes versus 16 failures). The conclusion is straightforward. Closeness matters – and not only in horseshoes and dancing. The estimated size of the effect is such that an increase in closeness with one standard deviation unit increases turnout rates by approximately 0.58–0.69 standard deviation units. This estimate of the effect size is statistically significant at better than the 95% confidence level.

Importantly, we can place these empirical efforts into two groups: *ex post* and *ex ante* studies. *Ex post* studies use the actual election result as the basis of the closeness variable. *Ex ante* studies try to estimate the closeness of the election via previous election results, opinion polls, newspaper reports and so on. Rational theories of voting point to the use of *ex ante* closeness measures, arguing that the probability of being decisive is determined by the individual’s subjective estimate of how close the candidates are in the race (Mueller, 2003). Despite this theoretical argument, the *ex post* approach has become more or less standard practice. In point of fact, over 70% (259 out of 362) of the test results in our sample are obtained using *ex post* measures. Still, this approach has been contested on several grounds. Firstly, it implicitly assumes rational expectations on the part of the voter concerning defeat or victory (Mueller, 2003). That is a strong assumption unless nothing changes between consequent elections: same arrangement of electoral districts, same candidates, ... (Kirchgässner and Zu Himmern,

¹⁴ The 2004 US presidential elections suggest that close overall results may attract more voters also in ‘safe’ districts. Whereas voter turnout (compared to the 2000 US presidential elections) leaped on average almost 7% in the six ‘swing’ states (Florida, Ohio, Iowa, Wisconsin, Minnesota and New Mexico), turnout in the remaining states rose on average by around 3%. A similar finding arises when comparing the 20 states considered by either or both of the main parties as ‘battle-ground’ states with the ‘safe’ states. Turnout increased about 4.5% on average in the former states and 2.5% in the latter (calculations based on preliminary turnout data provided by Michael McDonald at <http://elections.gmu.edu> – accessed 09/11/2004).

1997). Secondly, Shachar and Nalebuff (1999) state that ex post closeness is typically a function of the dependent variable leading to biased estimates. This is empirically substantiated in Kuncz (2001, 27) where a Hausman specification test ‘significantly rejects the null hypothesis of no simultaneity’. Thus, the use of ex ante measures – as prescribed by the theoretical model – may more accurately predict the effect of closeness on turnout.

To see whether the use of ex ante rather than ex post measures affects the empirical results, we calculate the success rate in each category and test whether there is a statistically significant difference between both groups (cf. Imbeau et al., 2001). This shows that the studies using ex post measures provide 132 successes on 259 estimates (or a success rate of 51%) whereas those using ex ante measures record 76 successful tests in 103 attempts (or a success rate of 74%). The difference between these success rates is statistically significant at better than the 5% level ($t = 4.04$). Hence, tests that use ex ante measures of electoral closeness generate a significantly higher success rate than those using ex post measures.¹⁵

4.2.2. Campaign expenditures

The previous section already mentioned that campaign expenditures might have a positive effect on turnout rates. Several arguments for this contention have been offered. Firstly, campaigns increase information and awareness levels within the electorate and decrease the costs of information acquisition (Dawson and Zinser, 1976; Chapman and Palda, 1983). Both increase the probability of turning out. A second element is found in the ‘get-out-the-vote’ campaigns (Cox and Munger, 1989). These do not necessarily provide information about the candidates but try to enlarge the feeling of ‘civic duty’ of the voter. This should also increase turnout rates. Obviously, every extra cent spent on a campaign cannot remain equally successful in getting people to the polls. Hence, it is expected that turnout increases with campaign expenditure, but that the effect levels off with higher campaigning efforts.

Not all campaigns are expected to increase turnout. Some may even drive potential voters away from the polls. This is especially likely for ‘negative’ or ‘attack’ advertising. Ansolabehere et al. (1994) present two lines of argument in support of this view. On the one hand, negative ads might decrease the support for the candidate attacked, which is likely to lower turnout among his/her supporters. On the other hand, negative campaign content might create a negative view over the attacked as well as the attacker and/or demobilise voters because it creates a negative view about politics in general. Finkel and Geer (1998), however, state that at least three reasons exist why turnout may in fact be enhanced by negative campaigns. First, these campaigns provide a load of performance information about parties (candidates). This increases the information level of the electorate. They are also likely to facilitate candidate image differentiation and, finally, they tend to produce ‘stronger affective responses’ (making the voter care more about the election outcome).

The empirical results abundantly support the claim that campaign spending increases turnout. The 20 studies in our sample provide 97 supportive test results. These are much more frequent than the 33 non-significant results and four anomalies. The same holds at the level of the studies, where 17 are marked as ‘success’ and 3 as ‘failure’. Also in line with the theoretical

¹⁵ Individual-level studies appear not to have taken the closeness-turnout link at heart. The few exceptions, however, do not appear very supportive. Matsusaka and Palda (1999) find the (ex post) margin of victory not to matter for the individual’s probability of voting. Copeland and Laband (2002) exploit a survey question asking respondents whether (s)he thinks the election will be a ‘close call’ (an ex ante closeness measure). They find an insignificant positive relation between the probability of voting and the respondent indicating the expectation of a close race.

arguments lined out above is the finding that the effect of campaign expenditures on voter turnout is often found to be significantly non-linear (e.g. Caldeira and Patterson, 1982; Patterson and Caldeira, 1983; Cox and Munger, 1989; Jackson, 1997; Hogan, 1999). Interestingly, the effect of campaign expenditures might well be related to the message that is brought in the campaign. Kirchgässner and Schulz (2004), for example, show that mobilisation in Swiss referenda is more successful for ‘No’ campaigns than for ‘Yes’ campaigns. Ansolabehere et al. (1994, 1999) find that turnout falls when the campaign tone is more negative. Lau and Pomper (2001) reveal that this only holds for extreme levels of negativism (turnout is actually stimulated for most levels of negativism).¹⁶

Finally, we highlight the results of two specific studies. Chapman and Palda (1983) demonstrate that campaign effort has different effects in a study of provincial election results in 10 Canadian provinces. With the hypothesis and results of Ansolabehere et al. (1994) in mind, this may reflect differences in campaign tone over the various areas. However, this is but a tentative explanation as Chapman and Palda (1983) provide no information about this in their work. Pattie and Johnston (1998) find that the campaigning of different parties in the UK does not have the same effect. Labour and Conservative spending increases turnout, but spending by the Liberal Democrats has very little effect (and even tends to depress turnout). This, in our reading of the results, may be an indication that campaigning by smaller parties is less influential. Or it may indicate that small (or, by extension, opposition) parties use a different tone in their campaigns, leading to different effects on turnout rates. Nonetheless, these are mere hypotheses requiring further analysis.

4.2.3. *Political fragmentation*

The general intuition behind the concept of political fragmentation may be clear. It refers to the number of parties that participate in the election. From a theoretical point of view, there is no consensus whether fragmentation can be expected to increase or decrease turnout. A *positive* effect can be expected on the basis of two arguments. Firstly, a larger number of parties enriches the choice offered to the electorate, increasing the probability that voters can identify with some party (Seidle and Miller, 1976; Blais and Carty, 1990; Hansen, 1994). This can be expected to enlarge the benefits of voting to the individual. Secondly, Dittrich and Johansen (1983) argue that more parties increase the competitiveness of the party system and thereby the potential benefits from selecting ‘good policy’. However, this argument may be flawed as one could expect that in a more competitive system the quality of any proposed policy will be higher (and turnout depends on the difference in utilities between platforms, not the level of the preferred platform only, cf. Downs, 1957).¹⁷ A *negative* effect can be expected as an increase in the number of parties is likely to enlarge the need for coalition formation under given

¹⁶ Using individual-level research, Kahn and Kenney (1999) show that ‘mudslinging’ reduces the likelihood of turning out, while ‘legitimate criticism’ increases turnout (see also Goldstein and Freedman, 2002). This differential effect on turnout from the degree of negativity may explain why a meta-analytic assessment of predominantly experimental and survey evidence ‘fails to confirm the widely held view that negative advertising should bear a major share of the blame for the widespread political disaffection of recent decades’ (Lau et al., 1999, 859). Another possible reason is that different groups of individuals (independents versus partisans, politically interested versus apathetic, ...) are differentially affected by campaigns and the tone thereof (see Kahn and Kenney, 1999; Wattenberg and Briens, 1999).

¹⁷ Still, the benefit from expressing a preference for better policies is likely to be higher than expressing such a preference for policies of lower quality. Hence, the higher quality of platforms might increase the expressive benefits of voting – leading to higher turnout.

electoral rules (Jackman, 1987; Blais and Carty, 1990; De Winter et al., 1991). This decreases the direct influence of the electorate in the choice of who governs it. Blais and Dobrzynska (1998) contend also that more parties might increase the complexity of the political system and make it harder for the voter to make up his mind. This increases the information costs of the voter and reduces his likelihood of heading to the polls (Hoffman-Martinot, 1994).¹⁸

Many authors have used definitions of fragmentation that go beyond a simple count of the number of parties in the election by incorporating (through the use of concentration indices) the size inequalities between the parties in their fragmentation measure. Specifically, scholars have relied on the ‘effective’ number of parties (Laakso and Taagepera, 1979), which corresponds with the inverse of the Herfindahl index, and measures of ‘entropy’ (see e.g. Kirchgässner and Schimmelpfennig, 1992). In our sample, 22 studies test for the effect of political fragmentation on turnout. In total, 75 coefficient estimates are provided. The results are clearly inconclusive. There is an almost equal distribution of test results over the three categories and the 95% confidence interval around the estimated effect size r_{av} encloses 0.

A possible explanation for these results (or lack thereof) lies in the at times large differences in the electoral rules that are used. Whereas votes for smaller parties may easily be considered ‘wasted votes’ in majoritarian electoral systems, this is not so in systems of proportional representation. Individuals who want to vote for small parties thus have less reason to turn out under majoritarian electoral rules than under proportional representation.¹⁹ This would imply that the level of political fragmentation affects turnout rates differently under alternative electoral rules. Due to the limited number of studies, we were not able to test this hypothesis in the present study.

4.3. Institutional variables

The electoral procedures that govern the course of the elections in a country consist of several distinct elements such as the electoral system, registration requirements, compulsory voting and so on. Each of these elements may have an effect on the number of people that cast a ballot. In the remainder of this paragraph, we review some of the most important arguments and results concerning the effects of different electoral procedures on turnout. The results are brought together in Table 4.

4.3.1. Electoral system

The electoral system is ‘the means by which votes are translated into seats in the process of electing politicians into office’ (Farrell, 2001, 4). Whether one uses majority, plurality or proportional representation (PR) is generally believed to have an effect on the number of people turning out. The main reason why turnout is expected to be *higher* under PR is the large disproportion between votes and seats in a majority system (Ladner and Milner, 1999). This may

¹⁸ In relation to these arguments, analysis on individual-level data from 15 democracies shows that, when the effect of coalitions is controlled, ‘larger party systems help spur participation rather than hinder it through complicated task environments’ (Brockington, 2004, 485).

¹⁹ The reason why potential supporters of smaller parties may feel they waste their vote in non-proportional systems (a ‘psychological effect’) is that small parties face a much higher hurdle to obtain representation in such systems (a ‘mechanical effect’) (see Duverger, 1954). This higher threshold is likely to discourage voters of the smaller parties in the election.

Table 4
Results of meta-analysis for institutional variables

	Success	Failure	Anomaly	Success rate (%)	r_{av}
Electoral system					
Tests	49	22	0	69.01	0.69*
Studies	10	4	—	71.43	0.63*
Compulsory voting					
Tests	61	7	0	89.71	0.89*
Studies	13	2	—	86.67	0.86*
Concurrent elections					
Tests	76	46	7	58.91	0.53*
Studies	12	10	—	54.55	0.49*
Registration requirements					
Tests	46	15	0	75.41	0.75*
Studies	13	3	—	81.25	0.75*

Note: * denotes statistical significance at better than the 5% level.

lead potential voters to believe that their vote is of no importance (especially supporters of the smaller parties) and will restrain them from going to the poll booth (Jackman, 1987). Another argument advanced by Blais and Carty (1990) is that, under PR, districts are less likely to be non-competitive. This gives parties more incentives to campaign everywhere (which, as noted before, increases turnout). Finally, Powell (1980) argues that PR leads to more powerful party-group linkages, thereby increasing turnout.

Nevertheless, some *counterarguments* have been provided (Ladner and Milner, 1999). First of all, majoritarian electoral systems may be easier to understand for the average voter. This stimulates participation under such systems compared to the ‘more difficult’ proportional systems. Secondly, PR systems often witness coalition formations. These obscure the link between the voter’s action and the election outcome. This makes it harder to work out the optimal voting strategy and increases dissatisfaction with the electoral system as such. Once again, turnout will then be lower under PR than under majoritarian systems.

There are 14 studies in our sample that provide 71 estimates on the relation between the proportionality of the electoral system and voter turnout. All but two of these work with datasets based on cross-country variations in voter turnout. Ladner and Milner (1999) exploit the difference in regulations across Swiss municipalities and Bowler et al. (2001) compare elections in US jurisdictions using plurality rules versus cumulative voting (a semi-proportional electoral system). With a success rate hovering around 70%, the empirical results show that more proportional systems are associated with higher turnout rates. This conclusion is strengthened by the estimated size of the effect, which is significantly positive.²⁰

4.3.2. Compulsory voting

It is often argued that compulsory voting is likely to increase the expected costs of not voting to the individual due to the possibility of getting caught. Such an argument is not only based on the pecuniary implications of getting caught (and fined). Indeed, getting caught and fined for

²⁰ Relying on post-election survey data from the New Zealand Election studies (1990, 1993 and 1996), Karp and Banducci (1999, 375) show that ‘the adoption of PR can have a positive effect on political efficacy and voter participation, although perhaps not as great as some would have hoped’. Perea (2002) and Brockington (2004) provide further supportive evidence building on survey data from 15 democracies.

disobeying the law might also reduce one's social prestige. To the extent that one wants to be known as a law-abiding citizen (and a trustworthy person in general), one's utility decreases by being caught not-voting. Hence, theoretically, a positive correlation between voter turnout and mandatory voting is hypothesized.

Our results support the contention by [Blais \(2000\)](#) that the effect of compulsory voting on turnout is one of the robust findings in studies that analyse cross-national variation in voter turnout. Indeed, 13 of the 15 studies in this review that include a dummy variable for compulsory voting, significantly support the theoretical prediction. The other two studies provide insignificant test results. Looking at these test results rather than the studies' overall result, we find 61 successes, 7 failures and no anomalies. It can thus be concluded that turnout at the polls is significantly higher where compulsory voting laws exist (for individual-level evidence, see [Perea, 2002](#) and [Brockington, 2004](#)).

4.3.3. *Concurrent elections*

In some countries, several elections are organised at the same time. These concurrent elections can be expected to affect the voter's calculus because any individual voter is likely to be 'at least somewhat concerned (albeit not equally) with all of them' ([Wuffle, 1984, 579](#)). Specifically, two reasons for a positive relation between voter turnout and the incidence of concurrent elections have been advanced. Firstly, more races increase the likelihood that the media pays attention to at least one of the elections and increases the amount of money spent on campaigns ([Cox and Munger, 1989](#)). This should increase the general awareness and information level of the electorate, which can be expected to lead to higher voter turnout. Secondly, [Filer and Kenny \(1980\)](#) and [Carter \(1984\)](#) argue that the cost of going to the poll booth is a fixed cost, unrelated to the number of elections the voter needs to cast a vote upon. Consequently, 'an added election on the ballot spreads the cost of voting' ([Carter, 1984, 201n](#)). This too should lead to higher turnout rates.

All 22 studies that estimate the effect of concurrent elections do so via the inclusion of one (e.g. [Dawson and Zinser, 1976](#); [Hill and Leighley, 1993](#)) or more (e.g. [Barzel and Silberberg, 1973](#); [Crain and Deaton, 1977](#)) dummy variables. It turns out that 12 analyses find that turnout significantly increases when there are concurrent elections. The other 10 studies fail to corroborate the theoretical expectation. Looking at the individual coefficient estimates, we observe a slightly larger majority in the 'success' category (76 successes against 46 failures and 7 anomalies). Though these results do not appear overly clear (the success rate is only slightly above 50%), the estimated effect size is nonetheless statistically significantly larger than 0. Hence, it can be concluded that turnout is positively affected by the presence of other elections on the ballot.

4.3.4. *Registration requirements*

Finally, there is the issue of registration requirements. The existence of such requirements — if they have to be fulfilled by the voter — does not only create direct monetary costs (e.g. time and energy to become registered), but also additional information costs (e.g. to find out when and where to register) ([Kelley et al., 1967](#)). [Rosenstone and Wolfinger \(1978, 22\)](#) argue that 'this requirement [to register] makes voting a more difficult act than it otherwise would be' and is likely to lower the number of people actually turning out. They also provide individual-level evidence in support of this hypothesis (see also [Ashenfelter and Kelley, 1975](#); [Wolfinger and Rosenstone, 1980](#); [Caldeira et al., 1985](#)).

Three out of every four estimates in our sample are successful (46 successes versus 15 failures and no anomalies). Automatic registration, Election Day registration and the absence of literacy tests and poll taxes all lead to significant increases in turnout rates. Empirical work thus strongly supports the depressing effect on turnout of tighter registration procedures.

5. Conclusion

Browsing the (aggregate-level) empirical literature on voter turnout would most likely lead to the conclusion that little agreement has been reached about what explains this phenomenon. This is reflected in the huge number of variables brought in relation with turnout rates and in the observation that none of these variables is omnipresent. Even elements that are crucial to Downsian rational choice theory – such as the effect of population size and electoral closeness – fail to be universally applied. Does this lack of agreement indicate that no variable is *de facto* indispensable, or rather that we have as yet merely failed to recognize such variables? The answer to this question constituted the objective of the present paper.

Our results – based on a meta-analysis of 83 aggregate-level empirical studies – indicate that the latter answer is likely to be most accurate. Indeed, we found that a number of (theoretically important) variables are significantly related to turnout rates. *First of all*, population size and electoral closeness – both related to the probability of affecting the outcome of the election – more often than not have a statistically significant effect on turnout in the predicted direction. Turnout is higher when the population is smaller and the election closer. *Second*, whereas a more stable population appears to positively affect turnout rates (due to higher social pressure and lower information costs), no relation appears to exist between turnout and population concentration and homogeneity. *Third*, we find that campaign expenditures are positively related to turnout rates, conform theoretical expectations, while the level of political fragmentation appears to have no unambiguous effect. However, more information is needed with respect to both these results. When and how is the effect of campaign expenditures affected by campaign tone and content (cf. Ansolabehere et al., 1994; Kirchgässner and Schulz, 2004)? Do opposition and incumbent parties use different campaign tones and does this explain the differential effect on turnout of their campaigns (cf. Pattie and Johnston, 1998)? How is the relation between turnout and fragmentation affected by the electoral system? *Finally*, the institutional procedures governing the course of the elections strongly affect turnout. Compulsory voting, easier registration procedures, concurrent elections and the use of proportional representation all significantly stimulate turnout.

Though questions remain, previous examination has made headway in explaining turnout. However, this knowledge does not appear to have been fully absorbed. Based on our results, we argue for the construction of a ‘core’ model of turnout. In this model, those variables that have proven their worth in previous research and are clearly linked to theoretical work ought to be considered as cornerstones. This would imply that, say, variables measuring the closeness of the election, voting habits and the size of the population are indispensable to any future analysis of turnout (at whatever level of analysis) to avoid misspecification (for a related claim to include ‘election characteristic’ variables in individual-level research, see Franklin, 2004). Starting out from such a ‘core’ model, testing further hypotheses can but increase our knowledge of a phenomenon that has troubled researchers for a long time.

Appendix A

Table A.1
Summary information of 83 aggregate-level studies

Study	Sample	Definition turnout
Alford and Lee (1968)	282 US cities (1961–62 city elections)	Number voted/number registered
Barzel and Silberberg (1973)	122 US gubernatorial elections (1962–64–66–68)	Number voted/voting age population
Rosenthal and Sen (1973)	Over 350 French districts (1958–68 legislative elections)	Absent and blank votes/number registered
Karnig and Walter (1974)	288 US cities (1961–62 city elections)	Number voted/voting age population
Denver and Hands (1974)	615 UK constituencies (1959–70 general elections)	Number voted/number registered
Blank (1974)	50 US states (1960–64–68 presidential elections)	Number voted/number eligible voters
Silberman and Durden (1975)	US districts (1962 and 1970 Congressional elections)	Number voted/voting age population
Kim et al. (1975)	US states (1960 presidential elections)	No clear indication given
Kau and Rubin (1976)	50 US states (1972 presidential elections)	Number voted/Voting age population
Settle and Abrams (1976)	26 US presidential elections (1968–72)	Number voted/voting age population
Seidle and Miller (1976)	142 UK counties (1964–66 general elections)	Number voted/number registered
Dawson and Zinser (1976)	383 Congressional districts (1972 House elections)	Number voted/number eligible
Filer (1977)	US counties (1968 presidential election and 1970 state election)	*Number voted/number eligible *Number voted/voting age population
Crain and Deaton (1977)	50 US states (1972 presidential elections)	Number voted/voting age population
Cebula and Murphy (1980)	35 US states (1976 presidential elections)	No clear indication given
Filer and Kenny (1980)	US Referenda (1949–76)	Number voted/number registered
Powell (1980)	30 Countries (national elections 1960–78)	*Number voted/number registered *Number voted/number eligible voters
Preuss (1981)	458 US counties (1968–72 presidential elections)	Number voted/voting age population
Caldeira and Patterson (1982)	240 US districts (1976–78 state legislative elections)	Number voted/number registered
Chapman and Palda (1983)	10 Canadian provincial elections (1972–78)	Absolute number votes cast
Patterson and Caldeira (1983)	46 US states in 1978–80 gubernatorial elections	Number voted/voting age population
Carter (1984)	50 US states (1980 presidential elections)	Number voted/voting age population
Cebula and Murphy (1984)	US states (1978 general elections)	No clear indication given

Table A.1 (continued)

Study	Sample	Definition turnout
Ostrosky (1984)	35 US states (1976 presidential elections)	No clear indication given
Foster (1984)	50 US states in 1968–72–76–80 presidential elections	Number voted/voting age population
Denver and Hands (1985)	622 UK constituencies (1959–79 general elections)	Number voted/number registered
Gilliam (1985)	394 US districts (1978 Congressional elections)	Number voted/voting age population
Powell (1986)	20 Democracies (national elections 1960–80)	Number voted/voting age population
Tucker (1986)	178 US districts (1976–82 legislative elections)	Number voted/number registered
Durden and Gaynor (1987)	418 US districts (1970 and 1982 Congressional elections)	Number voted/voting age population
Jackman (1987)	19 countries (national elections 1960–80)	Number voted/number of eligible voters
Cox and Munger (1989)	270 US districts (1982 presidential elections)	Number voted/voting age population
Eagles and Erfle (1989)	UK constituencies (1966, 1970 and 1983 general elections)	Number voted/number of eligible voters
Blais and Carty (1990)	20 countries (1947–88)	Number voted/size electorate
Crepaz (1990)	16 democracies (national elections 1985–88)	Number voted/number eligible voters
Lutz (1991)	516 UK constituencies (1974–89 general elections)	Absolute number of votes cast
Davis (1991)	107 US judicial court elections (1981–88)	Number voted/voting age population
Colomer (1991)	21 countries (1974–85)	Number voted/voting age population
Radcliff (1992)	29 Countries (1960–87)	Number voted/eligible population
	All presidential and midterm elections since 1896	Number voted/eligible population
Kirchgässner and Schimmelpfennig (1992)	248 German & 650 UK districts (1987 elections)	No clear indication given
Denver and Halfacree (1992)	561 UK constituencies (1983 general elections)	*Number voted/number registered *Absolute number of votes cast
Matsusaka and Palda (1993)	282 Canadian districts (1979–80 general elections)	Number voted/eligible population
Hill and Leighley (1993)	47 US states (1980–86 gubernatorial elections)	Number voted/voting age population
Filer et al. (1993)	3108 US counties (1948–60–68–80 presidential elections)	Number voted/voting age population
Kaempfer and Lowenberg (1993)	59 Countries (late 1980s)	Number voted/voting age population
Matsusaka (1993)	885 Californian ballot propositions (1912–90)	Number voted/number registered
Merrifield (1993)	1982 US general elections	Number voted/voting age population

(continued on next page)

Table A.1 (continued)

Study	Sample	Definition turnout
Ansolabehere et al. (1994)	34 US states (1992 Senate elections)	Number voted/voting age population
Hansen (1994)	428 Norwegian municipalities (1991 municipal elections)	Number voted/number of eligible voters
Hoffman-Martinot (1994)	382 French cities (1983 municipal elections)	Number voted/voting age population
Jackman and Miller (1995)	22 Countries (1981–90)	Number voted/voting age population
Hoffman-Martinot et al. (1996)	364 UK councils and 382 French municipalities (1983 and 1990 local elections)	*Number voted/number adults *Number voted/number registered
Jackson (1997)	50 US states (1988–90 presidential, gubernatorial and senatorial elections)	Number voted/voting age population
Kirchgässner and Zu Himmern (1997)	1152 German districts (1983–87–90–93)	No clear indication given
Blais and Dobrzynska (1998)	91 Countries (1972–95)	Number voted/number registered
Pattie and Johnston (1998)	2204 UK individuals in 1992 general election	Number voted/number registered
Grofman et al. (1998)	50 US states in presidential elections (1952–94)	Number voted/voting age population
Franklin and Hirczy de Mino (1998)	39 US presidential elections	Number voted/voting age population
Shachar and Nalebuff (1999)	50 US states (1948–88 presidential elections)	Number voted/voting age population
Ladner and Milner (1999)	950 Municipalities (1988 Suisse local elections)	No clear indication given
Hogan (1999)	455 US districts (1994 state legislative elections)	Number voted/number registered
Hill and Leighley (1999)	50 US states (1950–53–80–82–90–92 presidential and midterm elections)	Number voted/voting age population
Franklin (1999)	39 US presidential elections	Number voted/voting age population
Lapp (1999)	610 Montreal enumeration areas (1993–94 elections)	Number voted/number registered
Allers (2000)	485 Dutch municipalities (1998 municipal elections)	No clear indication given
Pelissero et al. (2000)	2361 US precincts (1991 and 1995 local elections)	Number voted/number registered
Blais (2000)	91 Countries (1972–95)	Number voted/number registered
Perea (2000)	16 Western countries (1945–94)	Number (not) voted/number registered
Pérez-Linán (2001)	17 South-American countries (national elections 1980–91)	Number voted/voting age population
Kunce (2001)	121 US state observations (1986–98 senate and gubernatorial elections)	Number voted/voting age population
Smith (2001)	650 US state observations (1972–96 general elections)	Number voted/voting age population
Lau and Pomper (2001)	50 US states (1988–98 senate elections)	No clear indication given
Bowler et al. (2001)	215 Local US elections	Number voted/voting age population

Table A.1 (continued)

Study	Sample	Definition turnout
Tolbert et al. (2001)	50 US states (1970–96 president and midterm)	Number voted/voting age population
Kraaykamp et al. (2001)	Dutch municipalities (1982–88)	Number voted/number of eligible voters
Geys and Heyndels (2002)	307 Flemish municipalities (2000 municipal elections)	Number voted/number registered
Endersby et al. (2002)	301 Canadian districts (1993 and 1997)	Number voted/number eligible voters
Siaroff and Merer (2002)	38 Countries (1990–2000 national election)	No clear indication given
Mattila (2002)	64 European Parliament elections (1979–99)	Number voted/number registered
Kostadinova (2003)	15 East-European countries (1990–2000)	Number voted/number registered
Søberg and Tangerås (2003)	230 Norwegian local referendums	Number voted/number eligible voters
Ashworth et al. (2004)	588 Belgian municipalities (2000 municipal elections)	Number voted/number registered
Kirchgässner and Schulz (2004)	Swiss referenda (1981–99)	Number voted/size electorate

Table A.2

Operationalisation of independent variables in 83 aggregate-level studies

Variable	Operationalisation	Frequency
Population size	Total population	13
	Voting age population	10
	Number registered voters	5
Population concentration	% Population in metropolitan/urban area	16
	Population per area	9
Population stability	% Moved	17
	% Homeowner (or tenant)	15
	Population growth rate	5
Population homogeneity	Interquartile difference in income	4
	Herfindahl ethnic heterogeneity	4
	Gini coefficient of income	3
Lagged turnout	Turnout (one or more lags)	7
	Turnout (average last 3 elections)	1
Closeness	Difference vote share winner/loser	36
	% Vote winner	5
	Entropy	4
	Ranney (1976) index	2
Campaign expenditures	Predicted closeness	2
	Expenditures per capita	9
	Total expenditures	7
	Expenditures as share of legal maximum	4

(continued on next page)

Table A.2 (continued)

Variable	Operationalisation	Frequency
Political fragmentation	Absolute number of candidates	11
	'Effective' number of candidates (or entropy)	8
	Dummy for multiple candidates	2
	Number of years of divided government	1
Electoral system	Dummies for various electoral systems	9
	Proportionality index	6
Compulsory voting	Dummy	15
Concurrent elections	Dummy	22
Registration requirements	Number of days between close registration and election	8
	Auto-registration dummy	4
	Dummy for literacy test, poll tax, ...	3
	'Tightness' of election laws	2

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