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JEL Classification: D7; E6; H6; J16.

Keywords: Fiscal policy; budget deficit; enfranchisement; median voter; gender.

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1 Introduction

Most would agree that at some level the average woman is different from the average man. What is less clear is whether gender differences can also be found in economic behavior, which in turn would affect economic outcomes at the macro level where differences among individuals are averaged out. A small but quickly growing empirical literature looks at how the increasing political and economic influence of women may have contributed to changes in economic outcomes in recent years. Using microeconomic data, Duflo and Udry (2004) and Pitt and Khandker (1998) investigate the impact of the relative influence of women on intra-household resource allocation, and find significant gender effects. In particular, women prefer to spend relatively more on the human capital on their children (food, clothes and education). Chattopadhyay and Duflo (2004) find that women's political influence in village councils in India matters substantially for the types of public goods provided. Moreover, research on the microfinance movement of the last decades has shown that with surprising regularity across cultures, women have superior repayment rates compared to those of men (United Nations Capital Development Fund, 2002; Kevane and Wydick, 2001; Wydick, 2002).

Much less research has addressed the question of whether female empowerment has affected macroeconomic outcomes¹. A number of studies look at the effect of women's political influence on government spending in industrialized countries. This literature argues that women care more about social issues and hence have a relatively stronger

¹See Stotsky (2006) for a recent survey.

preference for social expenditures than men. Therefore, as women gain increasing political power, we should see the size of the state (and social expenditures in particular) increase². The empirical evidence suggests consistently that female enfranchisement is associated with a change in the composition of public spending, while it is less conclusive on the effect on the size of the state (Abrams and Settle, 1999; Aidt et al, 2006; Lott and Kenny, 1999; Stutzer and Kienast, 2005; Funk and Gathmann, 2006). Another contribution is Seguino and Floro (2003), who look at the impact of women's relative bargaining power within households, as measured by the relative income of women, on aggregate savings in semi-industrial countries. They find support for the hypothesis that female decision making power on the household level leads to higher savings. But this is as far as the literature has come.

This paper contributes to the literature by asking whether women might prefer a different *public* savings level than men. If this is the case, then granting the right to vote to women may change the course of government budget deficits and debts, and may therefore ultimately affect the sustainability of public finances.

We focus on the impact of women's political influence on public savings for a number of reasons. First, the question has not previously been asked. Women's political influence and the use of deficit financing of public expenditures rose explosively in industrial countries in the post WWII era, making it interesting to know whether women's enfranchisement might have mitigated, or on the contrary added to recent public debt buildups. The second reason is related to data availability. We use a panel data set for Swiss cantons

²Metzler and Richards (1981) provide the theoretical underpinnings for this hypothesis.

to test our hypothesis, which has abundant data on government budgets while data on aggregate cantonal savings and many other macroeconomic variables are scarce. Third, we measure women's political influence by whether or not women have the right to vote, which, we argue in the following, can be considered a fairly exogenous measure of political influence compared to other measures used in the literature. Female suffrage proxies women's political influence on fiscal outcomes relatively well, while women's influence on other macroeconomic outcomes (such as household savings or investment decisions) is more complex and would hence be less well captured by female suffrage alone.

The way in which cantonal female suffrage was introduced in Switzerland provides conditions akin to a social experiment. Female enfranchisement was introduced in different years across cantons, and relatively recently (women were first given the right to vote in Neuchâtel and Vaud in 1959, and the last canton to grant women the vote was Appenzell I. Rh. in 1990 - all other 23 cantons introduced women's suffrage between these dates), allowing for a substantial amount of variation both in the time and in the cross-section dimensions. An additional advantage of this data set is that by studying the sub-federal level rather than national governments, and by using a difference-in-differences estimator, we reduce possible unmeasurable differences in political institutions and economic characteristics across the cross-sectional units, which might otherwise bias the results.

The results of our empirical investigation are clear and robust, implying that women's political influence does have an effect on fiscal outcomes: Women's right to vote has a statistically significant negative effect on cantonal government budget deficits.

The paper is structured as follows. The next section discusses the determinants of

budget deficits and how gender differences could possibly affect these. We conclude on a-priori grounds that the gender differences that are most likely to affect preferences for budget deficits should be sought among potential gender differences in time discounting, life expectancy, altruism, risk perception and prudence, rather than among gender differences in economic constraints (e.g. income, labor market participation). Section 3 discusses the estimation methodology, while section 4 deals with our data. Section 5 takes our question to the data for Swiss cantons for the period 1955 to 1999. The final section concludes.

2 Gender differences and preferences for budget deficits

Introducing female suffrage changes the preferences and constraints of the median voter if women have different policy preferences and are subject to different economic circumstances than men. Following standard median voter reasoning (Hotelling, 1929; Metzler and Richards, 1981), the franchise should hence matter for the government budget deficit if there are gender differences in preferences over the intertemporal allocation of spending on public goods and the intertemporal incidence of taxation. Focusing on the budget deficit rather than on the size of government allows us to abstract from all the reasons why women might want more or less public goods and transfers in general (see Funk and Gathmann, 2006), and only focus on whether one should want such public goods or transfers to be paid for today through higher taxes or tomorrow through a higher public debt, *given* the size of the state. There is for example no reason why having stronger preferences for social spending should translate into stronger preferences for running budget deficits, while how you value spending today relative to spending tomorrow is crucial for this decision. To evaluate

whether gender differences might affect preferences for budget deficits, we consider how the two genders' preferences for budget deficits might differ according to prevailing theories of budget deficits, taking into account the results of the literature on gender differences in preferences and relevant gender differences in economic circumstances.

The theoretical literature on budget deficits suggests four different categories of motives for running unbalanced government budgets: Normative fiscal policy motives; political economy motives (the deficit bias); inter-generational redistribution motives; and consumption smoothing/precautionary savings motives. The first two categories of budget determinants do not seem likely to be influenced by women's enfranchisement. Normative fiscal policy models such as the Barro tax smoothing model (Barro, 1979) and Keynesian countercyclical fiscal policy model prescribe running deficits in downturns and surpluses in upturns, with a zero (or neutral) deficit over the medium term. If women were found to suffer disproportionately from economic shocks or tax incidence, then we should expect women to want a more active countercyclical fiscal policy, but there is no reason to expect women to want persistently different levels of deficits than men with these theories in mind. Similarly, political economy motives for running deficits are based on the observation that deficits are shaped by the institutional setup within which elected politicians act in a democracy (time inconsistency a la Alesina and Tabellini, 1999; and common pool problems a la von Hagen and Harden, 1995), and there are no obvious reasons why adding female voters to the electorate should change this institutional setup.

The third category, intergenerational redistribution motives for deficits, on the other hand, is likely to be influenced by gender differences and hence the franchise. Note that

running a deficit today implies that taxpayers will have to pay for the servicing of the associated increase in the public debt in the future. Hence, if a voter does not expect to be paying taxes for long, he or she might deem a deficit today - yielding direct benefits in terms of higher public spending given tax revenues - less costly than another voter who expects to be around and pay taxes for longer. This means that voters with a longer time horizon will internalize a larger fraction of the intertemporal cost of a deficit today than voters with shorter horizons. Women may therefore prefer lower deficits than men simply because women tend to live longer than men³. Moreover, if women care more about their children's (or other peoples' children's) future welfare than men, then they may care more about the effects of running up debts today on the tax burden of future generations, which in turn could lead women to prefer lower budget deficits relative to men. There is a vast and ongoing experimental literature investigating whether women are more altruistic than men (see Croson and Gneezy, 2004, for a recent review). Not surprisingly, the answer depends on what is meant by altruism, but very broadly, women are in general found to be more concerned with the welfare of others than men.

The final category of determinants of deficits, intertemporal smoothing of public consumption and precautionary savings, is also potentially influenced by gender differences, as these public savings motives are determined by the individual's time preference and degree of prudence toward risk⁴. Whereas the standard representative agent assumption

³Women on average live about six years longer than men in Switzerland.

⁴These motives for public savings are identical to the reasons for private agents to save - see Browning and Lusardi (1996) for a thorough review of the literature on savings. To make the analogy to private savings motives, Ricardian equivalence can (for example) be broken by assuming that public and private goods are imperfect substitutes.

underlying mainstream economics implies that there is a common rate of time preference and degree of risk aversion and prudence for all individuals of an economy, the findings of behavioral economics and neuroscience suggest that in fact, behavioral characteristics such as time preference varies strongly across individuals, time, and types of situations and decisions to be made (Frederick et al, 2002; Camerer et al, 2005). The representative agent assumption is commonly defended by stating that on average, the preference characteristics of individuals of an economy can be taken to be approximately constant, at least in the long term and at the macro level. But if the average rate of time preference and degree of prudence vary systematically across gender, such a defense is no longer valid as women gain increasing political and economic influence. Appendix B lays out a simple median voter model which shows that the franchise leads to different outcomes for budget deficits when women have different preferences over fiscal outcomes than men.

While the literature is still not conclusive, the rate of time preference may display gender differences. Viewing time preference, or patience, through the lenses of evolutionary psychology could lead to the prediction that women have a biological⁵ bias toward caring more about the future than men, in that *“a sex difference in discounting is predictable. Because men have always had some chance of gaining fitness from short term expenditures of mating effort, whereas successful reproduction typically requires more prolonged parental investment by women, men should have evolved to discount the future more steeply than*

⁵Without getting into the debate on nature versus nurture, it is worth mentioning here that recent research has been able to establish the existence of biological gender differences in behavior, in that hormonal influences during pregnancy are found to play a role in determining the likelihood of certain behavioral traits which are usually considered gender stereotypical (see Baron-Cohen, 2003). But we still know very little about whether such biological gender differences are of any importance when viewed relative to the strong influence of socialization of the genders.

women” (Wilson and Daly, 2004, page S117.)⁶. The evidence is scarce - this is a very difficult hypothesis to test - but some survey and experimental studies of gender differences in time discounting provide support for this prediction (e.g. Kirby and Marakovic, 1996; Read and Read, 2004). Other studies find that average time discounting does not display gender effects, but that the way in which time discounting varies across types of intertemporal choices or situations is gender specific (e.g. McLeish and Oxoby, 2005; or the pretty woman effect of Wilson and Daly, 2004). Thus, while the evidence is mixed, there are some indications that we might expect women to prefer lower budget deficits for reasons of gender differences in time preference.

There is also some indication that women might want more precautionary public savings than men. The experimental and survey literature on gender differences in risk aversion is large and very active, converging on the conclusion that women in general seem to be more risk averse than men (see Croson and Gneezy, 2004, for a recent review). But risk aversion is only a necessary condition for individuals to wish to save for precautionary reasons. We also need to assess whether women are more prudent in their attitudes toward risk than men to make a firm prediction⁷, and this is a question which to our knowledge has not yet been asked.

⁶This prediction was the only one regarding time preference that we were able to find in the evolutionary psychology literature, but it is of course just one story among many possible stories about the evolutionary pressures facing humans in our Pleistocene past. An alternative story could for example be that men should have evolved to be more patient than women because men would have to invest a lot of time in accumulating sharper hunting skills than their male competitors in the quest to impress potential female mates (we are grateful to Paul Seabright for making this point).

⁷Formally, risk aversion requires that the utility function is concave, whereas prudence is a characteristic which is captured by a negative third derivative of the utility function. See Browning and Lusardi (1996) for how prudence determines precautionary savings.

To summarize, the review of the literature allows for the identification of the most important factors which affect preferences for budget deficits. These include life expectancy, altruism, patience and prudence toward risk. On grounds of life expectancy alone, we would expect women to prefer lower budget deficits than men. Moreover, if women are more altruistic, more patient and/or more prudent in the face of risk than men, then we should expect women to want lower budget deficits than men. Our prior is therefore that granting women the right to vote should lead to lower budget deficits, but given the mixed evidence on gender differences in behavioral traits, the question is ultimately an empirical one.

3 Empirical specification

Let v be a dummy variable which takes a value of unity when women have the right to vote, and zero otherwise. Our baseline empirical specification then relates cantonal budget deficits to their determinants in the following linear manner:

$$d_{c,t} = \alpha_c + \gamma_t + \psi_1 v_{c,t} + \varepsilon_{c,t} \tag{1}$$

where $d_{c,t} = b_{c,t}/n_{c,t}$ is the real budget deficit per capita in canton c at time t . The parameter ψ_1 is a time-invariant regression coefficient to be estimated, and α_c , γ_t and $\varepsilon_{c,t}$ are, respectively, a canton fixed effect, a time fixed effect and a canton and time varying error term.

The previous theoretical and empirical literature on budget deficits proposes a list of additional explanatory variables which are relevant for explaining deficits. First, as noted

in the previous section, Barro tax smoothing (Barro, 1979) and Keynesian countercyclical fiscal policy prescriptions imply that budget deficits should co-vary negatively with economic conditions. We therefore control for the rate of growth of real gross cantonal income (federal and international economic conditions will be captured through time fixed effects). Election cycles (Nordhaus, 1975 and Rogoff and Sibert, 1988) are controlled for by including a current and lagged dummy variable taking the value of unity for election years, and zero otherwise. We control for changes in the ideological orientation of cantonal parliaments (Hibbs, 1977; Persson and Svensson, 1989) by including the share of seats held by left-wing political parties. Finally, we control for two specific features of the Swiss federal fiscal system. Fiscal redistribution across cantons is taken into account by including the growth rate of the real unconditional federal grants per capita that each canton receives, and the presence of fiscal rules (Feld and Kirchgässner, 2005) is controlled for by including a dummy variable that takes a value of unity when fiscal rules exist in a given canton at a given time period.

4 Data

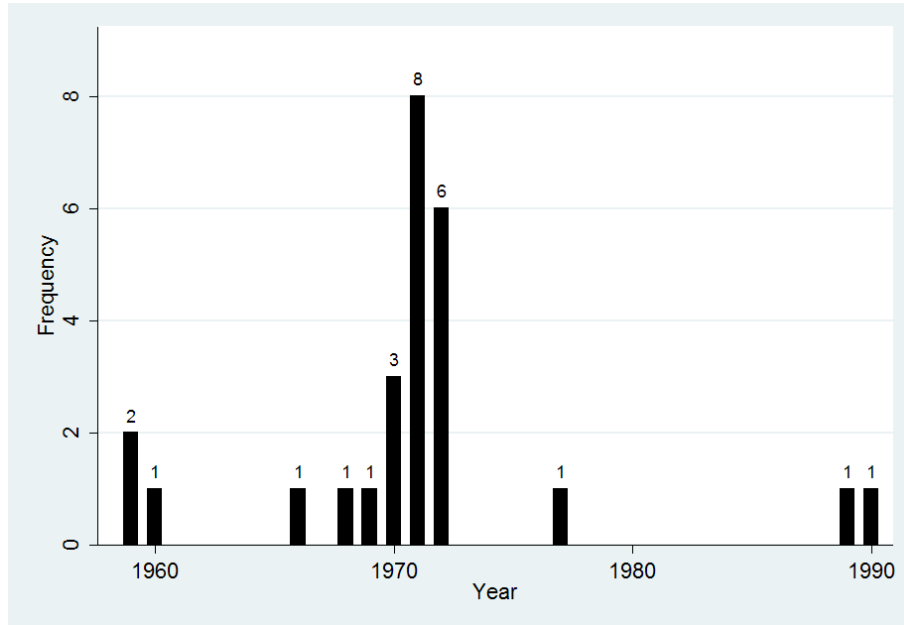
The sample covers twenty-five cantons over the period 1954 to 1999. All quantitative variables included in the regressions are measured in constant 1993 prices (deflated with the consumer price index). Sources and definitions are summarized in Appendix A. The canton of Jura is excluded from our sample since this canton was created in the late seventies and women were granted the right to vote at that time.

The right to vote and eligibility at the cantonal level was introduced across cantons

at different times between 1959 and 1990, implying substantial cross-sectional and time variation. Figure 1 illustrates the number of cantons that introduced women's suffrage for each year. The cantons of Vaud and Neuchâtel first introduced the right to vote for women in 1959, soon followed by the canton of Geneva in 1960. A few other cantons granted the right to vote during the sixties. A federal referendum in 1971, which led to the franchise at the federal level, induced many cantons to introduce the right to vote and eligibility for women in the early seventies. Appenzell A. Rh. only granted the right to vote at the cantonal level in 1989, followed by Appenzell I. Rh. which was forced to do so following a decision by the Federal Court of Justice.

Are the dates of women's enfranchisement truly exogenous to the economy? The history of the adoption of women's vote in Swiss cantons suggests that the answer is yes. The introduction of women's franchise at such a late stage compared to the rest of Europe was largely determined by political forces. Any modification of the federal constitution requires the approval of a majority of voters as well as a majority of cantons which delayed the adoption of female suffrage on the federal level. The Swiss membership of the Council of Europe in 1963 precipitated the enfranchisement, as a ratification of the European Convention on Human Rights required universal (including female) suffrage. To accommodate this, the Swiss Federal Council prepared a revision to the Constitution which was finally accepted in February 1971. The intercantonal variation in the introduction of women's vote also does not seem dependent on economic conditions per se. Funk and Gathmann (2006) show that cantonal support for the franchise was driven by time-invariant cultural characteristics (captured mainly by language) and the level of education in addition to the

Figure 1: Introduction of the right to vote for women



federal adoption of women’s vote.

Figure 2 illustrates the large cross-section heterogeneity in average cantonal budget balances. Only one canton, Appenzell I. Rh., had an average budget balance in surplus across the time span considered, while all other cantons exhibited average deficits. Figure 3 shows the average and median real budget balances per capita for each year from 1954 to 1999, exhibiting substantial time variation. The cantonal average budget was predominantly in deficit during our sample period, with the exception of the second half of the eighties. A closer inspection of the data reveals two outliers⁸. Appenzell A. Rh. had an extraordinary budget surplus in 1996 after the canton sold its cantonal bank. Moreover, Geneva had abnormally large budget deficits during the early nineties. We control for these outliers

⁸Figure A1 in Appendix A shows real budget balances for each canton over time.

Figure 2: Swiss cantons' average budget balances per capita between 1954 and 1999. In constant 1993 Swiss francs

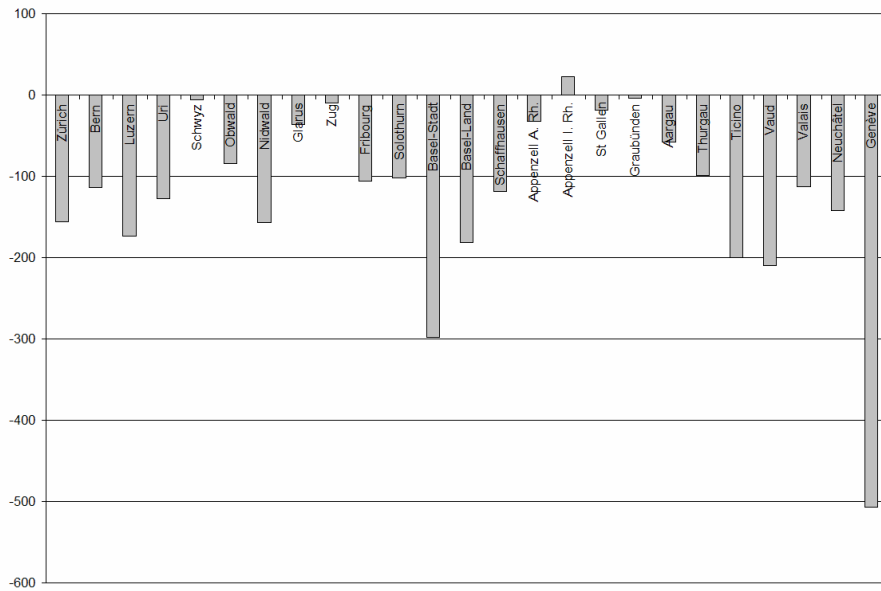
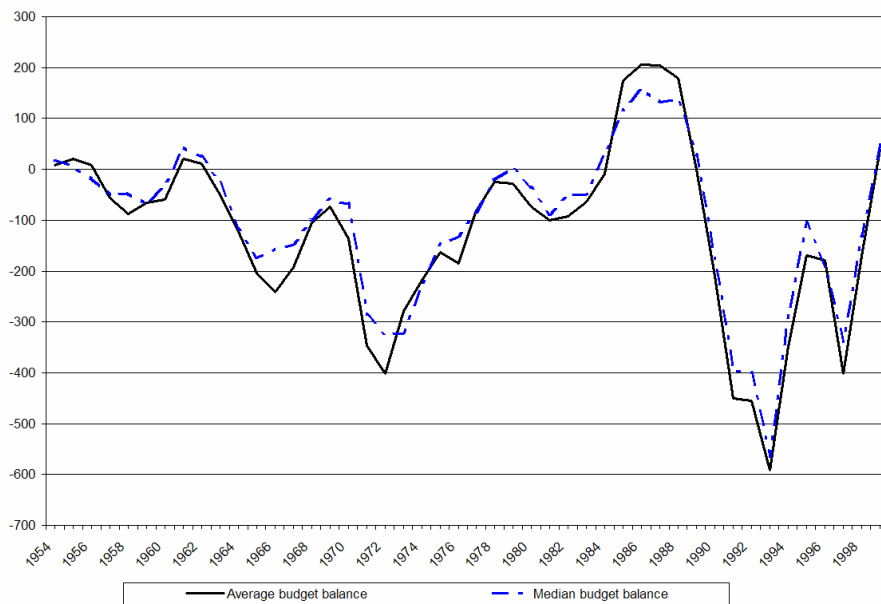


Figure 3: Cantonal average and median budget balances per capita, 1954-1999. In constant 1993 Swiss francs



using canton-specific time dummies.

5 Results

Table 1 presents the results from the estimation of equation (1). The null hypothesis that all coefficients are jointly equal to zero, and the null hypothesis that the fixed effects are equal are rejected for all specifications. Most time effects have significant impacts on the budget, picking up unobserved heterogeneity in federal and international variables. The time effects are particularly large and significant in the seventies and the nineties, two periods characterized by a generalized economic slowdown.

5.1 The impact of the franchise on budget deficits

In the baseline specification (I) including the dummy for female suffrage, canton and time fixed effects and dummy variables for outliers, the parameter estimate for the vote dummy of -117 is statistically significant at the 1% level, supporting the hypothesis that granting the right to vote to women reduces budget deficits. Specification (II) shows that the size and significance of the vote dummy are robust to the inclusion of the rate of growth of real gross cantonal income, the rate of growth of federal unconditional grants to cantons⁹ and a dummy variable for the presence of fiscal rules. The coefficient estimate for the rate of growth of real gross cantonal income turns out to be negative, as expected, but it is not significantly different from zero. Barro tax smoothing types of determinants of the

⁹Whether federal unconditional grants should be entered in growth rates, first differences or in levels (all of which are used in the literature) is unclear, so we have tried all three forms. The result is the same regarding the robustness of the vote dummy, which remains positive, of similar size and statistically significant on the 5 percent level in all three cases. We have used growth rates of transfers in our specification as these are stationary.

budget deficit could potentially still be present, however, as most of cantonal economic activity depends on federal and international factors which are captured by the time fixed effects. Increasing federal transfers are associated with lower budget deficits and this effect is statistically significant. Finally, the presence of fiscal rules improves budget outcomes but this effect is not statistically significant. Specification (III) adds the ideology of the cantonal parliament to the regression¹⁰. The estimated sign is in line with the prior that a more leftist parliament is associated with a higher budget deficit¹¹, but the coefficient is not significantly different from zero. Adding ideology does not result in any major change in the size or significance level of the vote dummy. Finally, specification (IV) which adds current and lagged election years, shows that there is no support for election cycles at the cantonal level in Switzerland. The vote dummy, meanwhile, retains its significance and size.

The number of observations decreases substantially when ideology is introduced (specifications (III) and (IV)), because the ideology of cantonal parliaments is missing for the cantons of Appenzell A. Rh. and Appenzell I. Rh., as well as for some years for Obwald and Nidwald. This decrease in sample size is the main reason for the moderate drop in the value of the parameter estimate of the vote dummy when ideology is introduced (rather than due to the introduction of ideology itself)¹². Finally, we also check whether the size

¹⁰Ideology of parliament could be expected to be caused by the franchise, thus leading to endogeneity problems when it is included. This is, however, not a problem here, since including ideology into a regression which already is restricted to include only the observations for which ideology is available does not change the parameter estimate for the vote dummy.

¹¹Although the sign of the parameter estimate is opposite to the theoretical prediction of Persson and Svensson (1989), who find that right wing parties would run deficits in order to increase the level of debt and thereby reduce the possibilities for spending of future left wing governments.

¹²Estimating specification (I) without the four cantons with missing observations yields a coefficient

Table 1: Determinants of real budget deficits per capita^{a,b}

Regressors	(I)	(II)	(III)	(IV)	(V)
Vote	-117.50 (3.23 ^{***})	-116.77 (3.21 ^{***})	-96.46 (2.20 ^{**})	-99.39 (2.26 ^{**})	-95.12 (2.16 ^{**})
Economic growth		-2.17 (0.37)	0.40 (0.06)	0.65 (0.10)	1.03 (0.17)
Federal transfers		-91.91 (2.17 ^{**})	-93.65 (2.10 ^{**})	-96.05 (2.10 ^{**})	-99.29 (2.18 ^{**})
Fiscal rule		-38.59 (0.95)	-40.67 (0.86)	-36.32 (0.76)	-49.62 (1.06)
Ideology			1.39 (0.54)	1.48 (0.57)	1.82 (0.71)
Election year				5.70 (0.25)	6.25 (0.27)
Pre-election year				-5.26 (0.25)	-4.35 (0.21)
Income per capita					-0.005 (1.54)
Dummy Appenzell A.Rh. 1996	-2821.04 (39.81 ^{***})	-2807.14 (36.99 ^{***})	- -	- -	- -
Dummy Geneva 1991	1281.21 (14.48 ^{***})	1271.81 (14.32 ^{***})	1266.95 (13.62 ^{***})	1269.11 (13.57 ^{***})	1285.18 (13.81 ^{***})
Dummy Geneva 1992	1020.71 (9.73 ^{***})	998.99 (9.22 ^{**})	997.98 (8.69 ^{***})	1006.28 (8.60 ^{***})	1011.47 (8.77 ^{***})
Dummy Geneva 1993	1990.34 (18.86 ^{***})	1978.20 (18.75 ^{***})	1948.39 (17.34 ^{***})	1944.05 (17.08 ^{***})	1942.71 (16.86 ^{***})
Dummy Geneva 1994	1172.66 (12.88 ^{***})	1162.18 (12.51 ^{***})	1133.02 (11.89 ^{***})	1136.48 (11.91 ^{***})	1124.93 (11.69 ^{***})
Observations	1125	1125	1024	1009	1009
Cantons	25	25	23	23	23
Canton-specific effects	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes
R^2 statistic	0.3667	0.3742	0.3854	0.3863	0.3697

^a Robust standard errors are used. Absolute values of t statistics in parentheses. * Significant at 10%; ** significant at 5% level; *** significant at 1% level.

^b The dependent variable is real budget deficits per capita (measured in 1993 Swiss francs).

and significance of the parameter estimate for the vote dummy is driven by a single canton. Dropping one canton at a time, the coefficient for the vote dummy variable remains positive, not substantially different in size, and statistically significant at the 5% level¹³.

As a small aside on the findings of estimating specifications (II) to (IV), the lack of significance of the larger part of the control variables is at odds with the findings of the empirical literature in general (see Imbeau, 2004, for a review of the findings of this literature). One reason for this could be that we include both time and fixed effects. Taking out time effects or cross section fixed effects, or both, leads to dramatically different results and a high level of significance of some of the additional control variables¹⁴.

To sum up, the parameter estimate for female suffrage is negative and statistically significant across all specifications. Regressions (I) to (IV) suggest that the impact lies somewhere between -97 and -117 Swiss francs per capita (measured in constant 1993 prices). Beyond statistical significance, is such a coefficient estimate economically relevant? Compared to the cantonal average real budget deficit of 123.98 Swiss francs per capita for the time period under study, the answer is a cautious yes. For example, a back-of-the-envelope calculation for 1999 suggests that a change in the budget deficit of between -97 and -117 Swiss francs (measured in 1993 prices) leads to a change of between 1.25 to 1.50 percent-

estimate for the vote dummy variable equal to -98.3, not much different from the parameter estimate obtained in specifications (III) and (IV). Note that excluding the two cantons of Appenzell from the sample is not desirable since these cantons granted the right to vote to women relatively late, in 1989 and 1990 respectively, thereby introducing important time variation in the vote dummy.

¹³We conducted this sequential exclusion of cantons using both the basic specification, and the specification including transfers per capita (all three forms of transfers, see footnote (9)). The results in both cases implied that the parameter estimate is robust. The only thing to note from this exercise is that the parameter estimate drops to about 73 when Geneva is excluded, implying some - expectedly - cross-cantonal heterogeneity. The results are not shown but can be obtained from the authors upon request.

¹⁴It is desirable to include fixed effects in such regressions to control for cross cantonal differences in fiscal preferences, however. Krogstrup and Wälti (2007) explores this issue further for fiscal rules.

age points in the ratio of cantonal spending which is deficit financed. Since the cantonal average budget was in surplus by an amount corresponding to half a percent of average cantonal spending in 1999, our estimates suggest that if women had not had the right to vote in 1999, the average cantonal budget would instead have been in deficit of about 0.75 and 1 percent of average cantonal spending. Compounded over decades, this could have a considerable effects on accumulated cantonal debt levels.

The literature estimating the impact of female suffrage on the size of the state using Swiss cantonal data consistently finds that the introduction of female voters significantly reduces cantonal spending. Hence, at least part of the reduction in deficits due to the franchise in Swiss cantons is likely to derive from expenditure reductions. To examine whether this is the whole story behind the suffrage effect on deficits, we regress real cantonal spending per capita and real cantonal tax revenues per capita on the vote dummy and control variables. The outcome of these regressions is presented in Table 2.

Table 2 shows that the introduction of the right to vote for women is associated with lower spending as well as lower taxes¹⁵, suggesting that on the average, Swiss women voters are more conservative regarding both the size of the state and deficit financing of expenditures than Swiss men¹⁶.

¹⁵The estimated negative impact on taxes is contrary to the findings by Funk and Gathmann (2006), which is curious given the rather similar estimation procedures used.

¹⁶While this is not the focus of the present exercise, the estimated impacts of ideology and fiscal rules in Table 2 are also worth noting. Much in line with expectation, both spending and taxes are higher when left-wing parties hold more seats in cantonal parliaments, while ideology was found to have no implication for the budget balance in the deficit regressions given in Table 1. Finally, the presence of fiscal rules does not only lead to lower spending, but also to lower tax revenues. Hence, our results indicate that both parliament ideology and fiscal rules affect the size of the state rather than one particular side of the public balance sheet.

Table 2: Spending and tax regressions^{a,b}

Regressors	(VI)	(VII)	(VIII)	(IX)
Vote	−612.74 (3.89 ^{***})	−981.53 (4.79 ^{***})	−453.16 (3.08 ^{***})	−850.97 (4.58 ^{***})
Economic growth	31.92 (1.39)	42.77 (1.84 [*])	37.35 (1.63)	45.92 (2.00 ^{**})
Federal transfers	−36.64 (0.21)	−19.50 (0.10)	49.24 (0.29)	85.61 (0.45)
Fiscal rule	−392.95 (3.24 ^{***})	−752.49 (5.04 ^{***})	−257.42 (1.64)	−696.38 (5.16 ^{***})
Ideology		68.21 (7.23 ^{***})		65.32 (7.49 ^{***})
Election year		−22.79 (0.27)		−31.05 (0.39)
Pre-election year		11.60 (0.13)		17.13 (0.21)
Observations	1125	1009	1125	1009
Cantons	25	23	25	23
Canton-specific effects	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes
R^2 statistic	0.4741	0.4931	0.4881	0.4976

^a Robust standard errors are used. Absolute values of t statistics in parentheses. * Significant at 10%; ** significant at 5% level; *** significant at 1% level.

^b Specifications (VI) and (VII) focus on real spending per capita, while Specifications (VIII) and (IX) deal with real tax revenues per capita.

5.2 Omitted variables

We can think of four omitted variables which could potentially be correlated with the introduction of the franchise and could potentially affect cantonal deficits. First, Swiss women have generally been less educated than Swiss men during the sample period¹⁷. Therefore, as women become part of the electorate, the average level of education of the electorate falls. Would less educated individuals prefer lower deficits? The literature has established a link from education to time discounting which suggests that the opposite is more likely to be the case (less education implies a greater discounting of time - see for example Harrison, Lau and Williams, 2002). However, this effect is likely to be a within-gender effect with the causality going from time discounting to choice of education, and if this is the only link, it should be picked up by the vote dummy and not be an omitted variable. Alternatively, if more educated individuals are more likely to be aware of the intertemporal budget constraint, they should prefer lower deficits¹⁸. But such a story implies that women should prefer higher budget deficits, counter to what we find. The level of education as an omitted variable is hence unlikely to be driving our results. At most, it could be suspected to downward bias the estimated effect of enfranchisement on deficits.

A second potential omitted variable is the income level of the electorate. There is clearly a potential link from level of income to preferences for the composition and level of public goods provision, but it is less clear that there should be a link from income levels to

¹⁷Stutzer and Kienast (2005).

¹⁸This argument could be based on a fiscal illusion type of reasoning a la Buchanan (1964).

preferences for deficit financing these public goods. One story could be that lower income individuals are likely to be more credit constrained than higher-income individuals, and might hence want the cantonal government to do more borrowing on their behalf. But this would imply that women should prefer higher, not lower, deficits. Hence, we again conclude that the average income level of voters is unlikely to be driving our results.

Third, the timing of women's suffrage and the timing of women's choice to enter the labor force could be correlated. If this is the case, then women's taxable income from work outside the household might increase income tax revenues of the canton at the time women get the right to vote. It is unfortunately not possible to directly test this hypothesis, as there is no yearly data on either labor market participation or employment by gender and canton¹⁹. We instead test this hypothesis indirectly by including real income per capita in the regressions (see Table 1, specification (V)). Measured income per capita should increase as women's income from work outside the household becomes included in the national accounts. Since real income per capita is not significant and does not change the parameter estimate for the vote dummy, we consider that female labor market participation is unlikely to be driving the results²⁰.

Fourth, women were granted the right to vote in a referendum in which only men would vote. It is hence possible that the date of female enfranchisement captures a change in the underlying preferences of male voters, which in turn also affects men's preferences

¹⁹Data on labor market participation and employment by canton and gender only exists in ten year intervals starting from 1980, from the Swiss decennial population census. Funk and Gathmann (2006) interpolate the remaining yearly data points, and use this data in cantonal panel regressions. Using interpolated data series would not make much sense here, as exact yearly changes around the time of enfranchisement would be needed to test the hypothesis.

²⁰We also tried including first differences of income per capita, with no change in the conclusions.

for deficits. If male preferences are such that liberal attitudes toward deficits also implies liberal attitudes toward female suffrage, the parameter estimate of female suffrage in deficit regressions would be downward biased, and hence would not drive the results. If, less intuitively, male support for female suffrage were decreasing in male support for deficits, then a negative correlation between female suffrage and deficits could be capturing the omitted variable of underlying time varying trends in male preferences rather than a causal relationship from female suffrage to deficits. Note that if there is no time-varying cantonal heterogeneity in male preferences for deficits and female suffrage, then the effect of such preferences would be captured in the time and canton fixed effects. We are hence only concerned with time-varying cantonal heterogeneity in male preferences pertaining to fiscal outcomes and female suffrage. Using data on male support for government expenditures as a measure of male fiscal preferences, Funk and Gathmann (2006) show that there is no time-varying cantonal heterogeneity in the fiscal preferences of men in their data. In additional regressions, they show that cantonal support for the franchise was not driven by fiscal variables.

6 Conclusion

If women have different preferences than men - be these of biological, social or cultural origin - then the political influence of women has the potential to affect macroeconomic outcomes through qualitative changes in policy or household decisions. Important economic effects of empowering women have been documented at the micro level. At the macro level, however, the literature on the effect of gender gaps in preferences has been narrowly focused

on the impact of political gender gaps on the provision of public goods and the size of the state. This paper adds to the literature on the effect of women's political and economic influence on macroeconomic outcomes by estimating the impact of female empowerment on government budget deficits, and hence, ultimately on public debt levels.

A panel regression analysis of the impact of the franchise on budget deficits in Swiss cantons shows that Swiss women indeed prefer lower budget deficits than men. The effect is small, but significant and very robust, implying that female enfranchisement may have mitigated the debt built-ups of the last decades. On a more general note, the findings suggest that vesting economic and political power with women is likely to change macroeconomic outcomes, not just because female empowerment doubles the available amount of talent or labor in the economy, but because women's preferences, and therefore decisions, are different from men's.

While our research design and macroeconomic data does not allow us to identify the exact underlying gender gap in preferences causing the results, the analysis does suggest that we are likely to be capturing differences in life expectancy, altruism, prudence and/or patience, rather than gender differences in economic constraints, such as income, education levels or labor market participation. The limited geographical scope of the analysis unfortunately does not allow us to deal with the question of nature versus nurture as the ultimate cause of these gender differences. If the finding is due to an underlying biological gender difference, then the effect of suffrage on budget deficits should be qualitatively the same across diverse cultures²¹. To address the question of nature versus nurture, the study

²¹This point is made very clear by Gneezy et al, 2006, in the context of the experimental literature on

could hence be extended by estimating the impact of female suffrage on budget balances for a set of more culturally diverse countries. We leave this for future research.

gender differences in the willingness to seek and accept competitive situations.

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A Data sources and definitions

Enfranchisement of women in Swiss cantons: Commission fédérale pour les questions féminines, 2001, Femmes, Pouvoir, Histoire. 1848-2000.

Nominal budget balances: Swiss Federal Finance Administration, electronic issue.

Population: Swiss Federal Bureau for Statistics, electronic issue.

Consumer price index: base year 1993. Swiss Federal Bureau for Statistics (Kindly provided by Stutzer and Kienast, 2005).

Growth rate of real cantonal income: 1965-2002: Swiss Federal Bureau for Statistics. Data prior to 1965: estimations by Stutzer and Kienast (2005).

Unconditional federal transfers: Swiss Federal Finance Administration, electronic issue, and *Annuaire statistique de la Suisse*, various issues.

Ideology of cantonal parliaments: share of seats in parliament held by left-wing political parties. Own calculations based on data from the Swiss Federal Bureau for Statistics, electronic issue.

Fiscal rules: simple dummy taking a unit value when a fiscal rule is in place. Own calculations based on Schaltegger (2002).

Cantonal elections: *Année politique suisse*, various issues.

Table A1: Summary statistics

Variable	Mean	Std. dev.	Min	Max
Budget balance per capita (1993 Swiss francs)	-121.111	348.417	-2806.204	2603.944
Vote dummy	0.634	0.482	0	1
Real economic growth	0.033	0.037	-0.105	0.190
Growth of real transfers per capita	0.059	0.246	-0.668	1.647
Fiscal rule dummy	0.102	0.302	0	1
Political ideology	0.238	0.136	0	0.577
Election year dummy	0.258	0.438	0	1
Pre-election year dummy	0.260	0.438	0	1
Income per capita (1993 Swiss francs)	33573.95	11820.56	9551	86413

B A median voter model with credit constraints and gender specific time preferences

When citizens are fully or partially credit constrained, the government budget deficit can be viewed as an indirect means of borrowing on behalf of the citizens. This means that citizens will want to run deficits for the same reasons that a credit-unconstrained citizen would want to borrow to smooth their consumption over time. In turn, these motives depend on individual preferences. We incorporate this view of the government budget deficit in a simple median voter model below. To have an effect on economic outcomes of extending the right to vote to women, we have to move away from the standard assumption of a unitary household as the unit of optimization, and assume that men and women optimize their respective utility under their respective constraints separately. Allowing preferences and hence utility to differ systematically across men and women then leads to gender specific differences in the preferred level of the government budget deficit, and in turn, to a different realized budget deficit as women are extended the right to vote.

The basic structure of the model is a two period model of the government budget, in which the first period budget balance is determined by the median voter through an election. The total population consists of n citizens, of which half is male and half is female. All citizens have the same fixed per period income which, without loss of generality, can be normalized to zero²². Moreover, each citizen receives an equal amount of net government

²²Allowing income to differ across men and women would complicate the derivations, but would not change the basic conclusions which are only driven by the differences in preferences assumed below. Even if we allow for the combination of progressive income taxation and a lower average income level of women, this would only affect the demand for public goods, but not the desired intertemporal financing profile, and hence, not the deficit. As we abstract from levels of spending and taxes here, we do not pursue this issue further.

transfers in each of the two periods, $g_t, t = 1, 2$, where the net transfer is defined as transfers received from government less taxes paid²³. The assumption that all citizens receive the same transfer clearly does not reflect reality very well, but is a simplification which underscores our results, and also allows us to abstract from deficits arising due to common pool problems²⁴.

Assume for simplicity that citizens are fully credit constrained (a partial credit constraint would do, but a full credit constraint simplifies the model significantly). The citizens derive utility from total consumption, which under the credit constraint and the normalization of private income to zero becomes equal to the net transfer. Thus, citizen i 's utility is given by the utility function:

$$U^i = u_i(g_1) + \beta_i u_i(g_2), \quad (2)$$

where u_i is the felicity utility function and $\beta_i = \frac{1}{1+\rho_i}$ is the time discount factor for citizen i . Assume further that:

$$u'_i(\cdot) > 0, \quad u''_i(\cdot) < 0, \quad \text{and} \quad \lim_{g \rightarrow -\infty} u'_i(\cdot) = \infty \quad \text{for all } i. \quad (3)$$

To keep to the basic assumptions of the median voter model, assume that citizens differ along one dimension only. In terms of the model, this dimension could for example be citizens' time preference, β_i , or the degree to which citizens are prudent and want to save for

²³This way of expressing net transfers was first proposed by Velasco (1999). Transfers from government can be seen as including both social transfers and public goods, as public and private goods are assumed to be perfect substitutes.

²⁴See Krogstrup and Wyplosz (2006) for a similar basic setup in which transfers can differ across groups, leading to common pool problems and a deficit bias.

precautionary reasons, u_i''' . We make the example of gender differences in time preference here. Assume that the time discount factor derives from one of two distributions, namely that of men and that of women. The $\beta_{i,h}$ is the subjective discount factor of individual i in gender group h , and is given by

$$\beta_{i,h} = \frac{2i}{n} \tilde{\beta}_h, \quad h = m, w \text{ and } i = 1, \dots, \frac{n}{2} \quad (4)$$

where $\tilde{\beta}_w$ and $\tilde{\beta}_m$ are the relative weights given to the future by the individual who cares most about the future within each of the two groups. Assume that on average women care more about the future than men:

$$\tilde{\beta}_w > \tilde{\beta}_m \quad (5)$$

Assumption (4) on the distribution of the subjective time discount factors may seem ad hoc, but the particular shape of the distribution is of no consequence for the results, as long as the median woman cares more about the future than the median man²⁵. The government's only role in this model is to set net transfers to its citizens by implementing the budget deficit policy announced prior to election (more on the election below). In doing so, it is allowed to borrow or lend at the relevant interest rate as a means of financing potential deficits/surpluses. The government is assumed to fully respect the intertemporal budget constraint, and there is therefore no issue of debt default in the model. Let b denote the government budget deficit in period one, such that $b = ng_1$. The intertemporal budget

²⁵Browning (2000) makes a similar core assumption on gender specific preferences in a model of intra-household savings decisions.

constraint thus becomes:

$$ng_1 + Rng_2 = 0 \quad (6)$$

where $R = \frac{1}{1+r}$. We assume that the economy is small and open, and hence, that the interest rate is fixed at the world level. Maximizing (2) with respect to first and second period net transfers, subject to the intertemporal budget constraint (6), yields the two first order conditions which implicitly give the preferred level of net transfers of citizen i :

$$FOC_1 : \frac{u'(g_1^*)}{u'\left(-\frac{g_1^*}{R}\right)} = \frac{\beta_i}{R} \quad (7)$$

$$FOC_2 : g_2^* = -\frac{g_1^*}{R}$$

where asterisks denote preferred policies, and g_1^* hence denotes the preferred net transfer in period one of citizen i . Note that (7) implies that the optimal transfer depends negatively on the relative weight that the citizen places on future consumption, β_i .

We now turn to the elections. Let two parties, which each derive utility solely from being in office, compete for government at the beginning of period one. The party which wins takes office immediately, at the beginning of period one, and stays in office till the end of period two. The two parties campaign by announcing a fiscal policy to be implemented if they win the election. Since their only objective is to be elected for office, they will both announce the policy which maximizes their respective number of votes. Citizen i will vote for the party with the announced deficit policy that attains her highest utility level. As is

standard in median voter models, both parties end up announcing the preferred policy of the median voter, which hence will be the winning policy²⁶. All we have to do to know the implemented fiscal policy is therefore to derive the preferred policy of the median voter.

The identity of the median voter depends on who has the right to vote. Assume first that only men have the right to vote. The time preference parameter of the median man (i.e. the $\frac{n}{4}$ th man), is

$$\bar{\beta}_m = \frac{1}{2} \tilde{\beta}_m$$

where bars denote values for the median voter. Following from (4) and (7), the median man's preferred budget deficit, $\bar{b}_{m,1}^*$, is implicitly defined by:

$$\frac{u' \left(\frac{\bar{b}_{m,1}^*}{n} \right)}{u' \left(-\frac{1}{R} \frac{\bar{b}_{m,1}^*}{n} \right)} = \frac{1}{2} \frac{\tilde{\beta}_m}{R} \quad (8)$$

Now extend the right to vote to women. Adding the distributions of the two groups horizontally yields a kinked distribution of subjective time discount factors for the entire population:

$$\beta_k = \begin{bmatrix} \theta \tilde{\beta}_m \frac{2}{n} k & \text{for } k \leq \frac{n}{\theta 2} \\ \frac{2\tilde{\beta}_w}{n} k - \tilde{\beta}_w & \text{for } k > \frac{n}{\theta 2} \end{bmatrix} \quad (9)$$

where $\theta = \frac{\tilde{\beta}_w}{\tilde{\beta}_w + \tilde{\beta}_m} > \frac{1}{2}$. The time preference parameter of the median voter of the total population (i.e. the $\frac{n}{2}$ th citizen), now becomes

²⁶For the standard median voter argument, see Hotelling's (1929) spatial voting model, and Metzler and Richards (1981) for an application to explaining the size of government.

$$\bar{\beta}_p = \theta \tilde{\beta}_m \quad (10)$$

where the p subscript denotes values for the median voter of the entire population. The associated preferred budget deficit policy of the median voter when women are included in the electorate is implicitly given by:

$$\frac{u' \left(\frac{\bar{b}_{p,1}^*}{n} \right)}{u' \left(-\frac{1}{R} \frac{\bar{b}_{p,1}^*}{n} \right)} = \theta \frac{\tilde{\beta}_m}{R} \quad (11)$$

Since $\theta > \frac{1}{2}$ by assumption, this implies that

$$\bar{b}_p^* < \bar{b}_m^*.$$

The median voter has a lower preferred budget deficit when women are included in the electorate under assumption (5).