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ABSTRACT

Elections with Contribution-Maximizing Candidates*

Much of the analysis of campaign contributions, in accordance with the Downsian model, has supposed that candidates seek contributions for electoral purposes. This Paper takes the opposite approach, by assuming that each candidate aims to maximize the contributions they collect. We let a citizen contribute to a candidate with the aim of increasing that candidate's chances of winning. These assumptions generate several plausible results: in equilibrium citizens make campaign contributions; the positions the candidates adopt differ; the willingness of the rich to make larger contributions than the poor moves the candidates to adopt positions the wealthy prefer. A cap on political contributions reduces spending by voters, but also increases the divergence in the platforms adopted by the candidates. If some voters are richer than others, a cap will benefit the poor and hurt the rich, although the overall welfare implications are ambiguous.

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NON-TECHNICAL SUMMARY

The insightful Downsian model of political competition assumes that candidates aim to maximize their chances of winning election. Much of the analysis of campaign contributions has therefore also supposed that candidates seek contributions for electoral purposes. This Paper takes the opposite approach, by assuming that each candidate aims to maximize the contributions they collect, and that they choose a policy with that purpose in mind. We let a citizen contribute to a candidate with the aim of increasing that candidate's chances of winning. These assumptions generate several plausible results: in equilibrium citizens make campaign contributions; the positions the candidates adopt differ; the willingness of the rich to make larger contributions than the poor moves the candidates to adopt positions the wealthy prefer. Our approach also allows the study of the effect of a cap on the contribution a voter may make. Though such a cap reduces spending by voters, it also increases the divergence in the platforms adopted by the candidates. The welfare effects of caps are therefore ambiguous. We find that if some voters are richer than others then a cap will benefit the poor and hurt the rich.

Our explanation for policy divergence can complement existing explanations. An important explanation for divergence in the candidates' positions arises from features of divided government, as in the United States. Alesina and Rosenthal (1995, 1996, 2000) and Fauli-Oller, Ok and Ortuno-Ortin (2001) show that when policy is a compromise between the President and Congress, each party has an incentive to choose a radical policy, aiming to move the adopted policy in its direction. Alesina and Rosenthal (1995) also find some support for this hypothesis. They compare estimates of the liberal-conservative position of US presidential candidates to the positions of senators. With the exception of the 1900 presidential election, all elections saw presidential candidates with ideological positions that lay more than one standard deviation away from the mean ideology in the Senate.

Additional explanations are well surveyed by Fiorina (1999). Candidates may diverge when they care about both election and policy. This motivation was first analysed by Wittman (1977). Calvert (1985), however, shows that policy-oriented candidates with perfect information about voters' preferences will converge to the position preferred by the median voter. Only if candidates are uncertain about voters' preferences will candidates diverge. Moreover, as Fiorina indicates, policy divergence has increased in recent decades, while the rise of polling, surveys and focus groups have probably improved the information candidates have about voters.

Our assumptions about a candidate's motives are in the spirit of Kramer's (1983) model, which supposes that a politician's gain from winning consists of

a monetary surplus, defined as the difference between the public budget and the amount paid to voters.

For a recent survey of how campaign contributions affect policy, see Milyo, Primo and Groseclose (2000). One explanation for the connection between contributions and policy is that contributors essentially bribe politicians, buying policy. Many studies, however, find that once controls for ideological and constituent preferences are included, a congress member's roll-call votes are unaffected by campaign contributions. For examples see Chappell (1982), Grenzke (1989), Levitt (1998), and Bonnars and Lott (1998).

Contributions may allow a candidate to spread their message and thus win more votes. Some models (for example, Grossman and Helpman, 1994) take the connection as given. The problem with this approach, as Wittman (2000) notes, is that if candidates adopt the positions favoured by special-interest contributors, then rational voters with different interests should take high contributions or high spending as a signal that the candidate favours special-interest policies, and so will vote against the candidate. Our Paper explicitly views campaign contribution as financing informational efforts that inform targeted voters of the positions of the candidates.

Most of the literature sees one set of actors as voters and another set as campaign contributors. Our joint analysis follows the spirit of Besley and Coate (1997) who consider the incentive of a citizen to run for office.

1 Introduction

The insightful Downsian model has led to a wealth of work built on the assumption that candidates aim to maximize their chances of winning election. Much of the analysis of campaign contributions has therefore also supposed that a candidate seeks contributions so that he can increase his chances of winning.

Our paper takes the opposite approach. We suppose that each candidate aims to maximize the contributions he collects, adopting a policy position accordingly.

Our explanation for policy divergence can complement existing explanations. An important explanation for divergence in the candidates' positions arises from features of divided government, as in the United States. Alesina and Rosenthal (1995, 1996, 2000) and Fauli-Oller, Ok, and Ortuno-Ortin (2001) show that when policy is a compromise between the President and Congress, each party has an incentive to choose a radical policy, aiming to move the adopted policy in its direction. Alesina and Rosenthal (1995) also find some support for this hypothesis. They compare estimates of the liberal-conservative position of US presidential candidates to the positions of senators. With the exception of the 1900 presidential election, all elections saw presidential candidates with ideological positions which lied more than one standard deviation away from the mean ideology in the Senate.

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is that if candidates adopt the positions favored by special-interest contributors, then rational voters with different interests should take high contributions or high spending as a signal that the candidate favors special-interest policies, and so will vote against him. Our paper explicitly views campaign contribution as financing informational efforts which inform targeted voters of the positions of the candidates.

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2 Assumptions

Two candidates, A and B, compete in an election. Each chooses a position on a one-dimensional issue; candidate A chooses position α; candidate B chooses position β, with $\alpha < 1/2 < \beta$.

Candidates use campaign contributions for two purposes. First, an exogenous fraction s is stolen, used for the candidate's personal benefit. A candidate's utility increases monotonically with the contributions he keeps, but with nothing else. Second, the fraction, $1 - s$, of contributions not stolen is used for campaigning. The campaign contributions made to candidate i are c_i.

Initially, a fraction ϕ of voters is perfectly informed about the positions of the two candidates. The other fraction, $1-\phi$, is initially uninformed. Campaigning is directed at such initially uninformed voters. A candidate can target any voter at a cost of one dollar. Such a targeted voter becomes fully informed about the positions of the two candidates, or less extremely, knows for sure which of the two candidates has a position which the voter prefers.

Each of n voters has single-peaked preferences over policy. An informed voter (one who is initially informed or who becomes informed from campaigning) votes for the candidate whose position is closer to the voter's ideal point. An uninformed person votes for candidate A over B with probability $1/2$. This randomness makes the election outcome random, and for plausible parameter values makes the probability that a given candidate wins election be a continuous function of the candidates' positions and of the campaign contributions he receives.

The fraction of voters with ideal points to the left of x is $F(x)$. The corresponding probability density function is $f(x)$. For simplicity, let the distribution of x be identical for initially informed and initially uninformed voters, and assume that the distribution is symmetric around the midpoint of the unit interval. Many of our results hold without the assumption of symmetry. Most importantly, our finding that candidates' positions diverge does not require that assumption. But symmetry simplifies the analysis (for example, the positions of candidates A and B will be equally distant from the ideal point of the median voter), and allows us to make strong welfare comparisons (for example, that campaign contributions reduce the expected aggregate utility of voters).

Each citizen can contribute to candidates, but of course, no uninformed

voter would contribute. For simplicity, we suppose that only voters who are initially informed make contributions. A person contributes only to affect the election outcome; the contributions are made after the candidates commit to policy positions on the unit interval.

A voter's utility is a separable function of income and of policy: the utility of a voter with income Y_v, who makes contribution c_v^i to candidate i, has ideal point v, and faces policy p is $U(Y_v, v, p) = -(v-p)^2 + m(Y_v - c_v^i)$, where $m' > 0$ and $m'' < 0$.

The equilibrium consists of the candidates' policies (α and β) of the voters' contributions (c_v^i), and of the votes each candidate wins.

3 Analysis

The number of votes A wins is

$$n\phi F\left(\frac{\alpha+\beta}{2}\right) + (1-s)c_A + \frac{n(1-\phi) - (1-s)(c_A+c_B)}{2}. \tag{1}$$

Candidate B's votes are

$$n\phi\left(1 - F\left(\frac{\alpha+\beta}{2}\right)\right) + (1-s)c_B + \frac{n(1-\phi) - (1-s)(c_A+c_B)}{2}. \tag{2}$$

Thus, the share of votes candidate A wins is

$$\pi(\alpha, \beta, c_A, c_B) = \phi F\left(\frac{\alpha+\beta}{2}\right) + \frac{(1-s)(c_A - c_B)}{2n} + (1-\phi)/2. \tag{3}$$

Candidate B's share is $1 - \pi(\alpha, \beta, c_A, c_B)$.

Let a candidate's platform be enacted with probability equal to his share of the votes. The contribution to candidate A made by a voter with ideal point at v is called c_v^A. The expected utility of such a voter is

$$U_v^A \equiv \pi(\alpha, \beta, c_A, c_B)(-(v-\alpha)^2) + (1 - \pi(\alpha, \beta, c_A, c_B))(-(v-\beta)^2 - m(Y - c_v^A) \tag{4}$$

The first-order condition with respect to c_v^A is

$$\begin{aligned} \left((v-\beta)^2 - (v-\alpha)^2\right)\frac{\partial \pi(\alpha, \beta, c_A, c_B)}{\partial c_A}\frac{\partial c_A}{\partial c_v^A} - m'(Y - c_v^A) &= \\ ((v-\beta)^2 - (v-\alpha)^2)\frac{1-s}{2n} - m'(Y - c_v^A) &\leq 0 \end{aligned} \tag{5}$$

A voter contributes to candidate A if and only if $v < v^A(\alpha, \beta) < (\alpha+\beta)/2$, in which case the above holds with equality. The cutoff value, v^A, is determined from

$$\frac{((v-\beta)^2 - (v-\alpha)^2)(1-s)}{2n} - m'(Y) = 0 \tag{6}$$

and equals

$$v^A = (\alpha + \beta)/2 - \frac{m'(Y)n}{(1-s)(\beta - \alpha)}. \tag{7}$$

Note that the more the candidates differ, that is, the larger the distance between the candidates' platforms, $\beta - \alpha$, the larger the fraction of the voters making positive contributions. Also note that when the candidates' platforms are sufficiently similar, $\beta^2 - \alpha^2 < 2nm'(Y)/(1-s)$, and voters make no contributions.

Define $h' = m'^{-1}$, invert (7), and rearrange to obtain $h(((v-\beta)^2 - (v-\alpha)^2)(1-s)/2n) = Y - c_v^A$ for $v < v^A$. Thus, aggregate contributions to candidate A when $\beta^2 - \alpha^2 > 2nm'(Y)/(1-s)$ are

$$c_A(\alpha, \beta) = \int_0^{v^A} [Y - h(((v-\beta)^2 - (v-\alpha)^2)\frac{1-s}{2n})]dF(v), \tag{8}$$

where v^A is determined by (7). If $\beta^2 - \alpha^2 < 2nm'(Y)/(1-s)$, then $c_A(\alpha, \beta) = 0$. By symmetry, $c_B = c_A(\beta, \alpha)$.

Differentiating (8) with respect to α yields the first-order condition, which determines the optimal position of candidate A:

$$\begin{aligned} \frac{\partial c_A(\alpha,\beta)}{\partial \alpha} \quad = \quad & \int_0^{v^A} -h'\left(\frac{((v-\beta)^2 - (v-\alpha)^2)(1-s)}{2n}\right)\frac{(v-\alpha)(1-s)}{n}dF(v) \\ & + \left[Y - h\left(\frac{((v^A-\beta)^2 - (v^A-\alpha)^2)(1-s)}{2n}\right)\right] f(v^A)\frac{\partial v^A}{\partial \alpha} = 0 \end{aligned} \tag{9}$$

where $\partial v^A/\partial\alpha = 1/2 - m'(Y)n/(1-s)\alpha^2$. Moreover, symmetry implies that, at equilibrium, $\beta = 1 - \alpha$.[2] The integral term above is non-negative, reflecting the willingness of a fixed number of voters to contribute more to candidate A as his position moves closer to the median. The second term, reflecting a change in the number of contributors to candidate A as he moves to the center, can be negative. Furthermore, the equilibrium positions must satisfy $\beta^2 - \alpha^2 > 2nm'(Y)/(1-s)$, for otherwise no contributions will be made. These results imply that $\alpha < 1/2 - nm'(Y)/(1-s) < 1/2$.

To summarize,

Proposition 1 *The equilibrium with each candidate adopting a policy position to maximize his contributions has the candidates diverge.*

Note that because of the political uncertainty associated with the identity of the winning candidate, each voter would prefer that both candidates position

[2] Note that the symmetric equilibrium is unique up to a permutation of the candidates.

themselves at the midpoint of the unit interval rather than at the equilibrium positions described above. The expected policy adopted by the candidates is the same as in the equilibrium we described, but there is no political uncertainty, and no campaigning.

4 Limits on political contributions

The last observation leads us to examine the effects of a cap, or limit, on the amount a voter may contribute. Let this cap be $\overline{c}$. The first four equations in the above analysis, describing vote shares and voters' utilities, remain unchanged. The first-order condition characterizing a voter's optimal contribution, equation (6), is now supplemented by $((v-\beta)^2-(v-\alpha)^2)(1-s)/2n - m'(Y-c_v^A) \geq 0)$, with equality when the preferred contribution is below $\overline{c}$. Clearly, only voters with ideal points far to the left would contribute $\overline{c}$ to candidate A; the cutoff level of the ideal point, $\overline{v}^A$ is

$$((\overline{v}^A-\beta)^2-(\overline{v}^A-\alpha)^2)(1-s)/2n - m'(Y-\overline{c}) = 0 \tag{10}$$

and it decreases in $\overline{c}$.

Aggregate contributions to candidate A are now modified (from (8)) to

$$c_A(\alpha,\beta) = \int_{\overline{v}^A}^{v^A} \left[Y - h\left(((v-\beta)^2-(v-\alpha)^2)\frac{1-s}{2n} \right) \right] dF(v) + \overline{c}F(\overline{v}^A). \tag{11}$$

As before, $c_B = c_A(\beta,\alpha)$.

The first-order condition which determines the optimal position for candidate A is

$$\begin{aligned} &\int_{\overline{v}^A}^{v^A} -h'\left(\frac{((v-\beta)^2-(v-\alpha)^2)(1-s)}{2n} \right) \frac{(v-\alpha)(1-s)}{n} dF(v) + \\ &\left(Y - h\left(\frac{((v^A-\beta)^2-(v^A-\alpha)^2)(1-s)}{2n} \right) \right) f(v^A)\frac{\partial v^A}{\partial \alpha} - \\ &\left(Y - h\left(\frac{((\overline{v}^A-\beta)^2-(\overline{v}^A-\alpha)^2)(1-s)}{2n} \right) \right) f(\overline{v}^A)\frac{\partial \overline{v}^A}{\partial \alpha} + \\ &\overline{c} f(\overline{v}^A)\frac{\partial \overline{v}^A}{\partial \alpha}. \end{aligned} \tag{12}$$

Because (inverting 10) $Y - h\left(\frac{((\overline{v}^A-\beta)^2-(\overline{v}^A-\alpha)^2)(1-s)}{2n}\right) = \overline{c}$, the last two terms in the expression above cancel each other, leaving the following first-order

condition for α.

$$\int_{\overline{v}^A}^{v^A} -h'\left(\frac{((v-\beta)^2-(v-\alpha)^2)(1-s)}{2n}\right)\frac{(v-\alpha)(1-s)}{n}dF(v)+ \quad (13)$$
$$\left(Y-h\left(\frac{((v^A-\beta)^2-(v^A-\alpha)^2)(1-s)}{2n}\right)\right)f(v^A)\frac{\partial v^A}{\partial\alpha}=0.$$

Symmetry implies that $\beta = 1-\alpha$. Differentiating (10) we obtain $\partial\overline{v}^A/\partial\alpha = 1/2 - m'(Y-\overline{c})n/\alpha^2$, which is positive and decreases with $\overline{c}$.

Totally differentiating (13) with respect to $\overline{c}$ and α shows that the tighter the cap, the smaller is α, indicating a larger divergence in policies.

Differentiating (11) with respect to $\overline{c}$ and making use of the envelope theorem leads to

$$-\overline{c}f(\overline{v}^A)\frac{\partial\overline{v}^A}{\partial\overline{c}}+\overline{c}f(\overline{v}^A)\frac{\partial\overline{v}^A}{\partial\overline{c}}+F(\overline{v}^A)=F(\overline{v}^A)>0 \quad (14)$$

Thus, as expected, the cap reduces total contributions.

Collecting the results,

Proposition 2 *A cap on the contributions a voter may make reduces aggregate contributions, and makes the platforms adopted by the candidates more divergent. Thus, the welfare consequences of such policy on voters consists of two opposite effects, and in general are therefore ambiguous . On the one hand, their consumption increases. On the other hand, uncertainty about which candidate will win, and so uncertainty about which policy will be adopted, also increases.*

5 Wealth differences

We now introduce differences in the voters' incomes, assuming that incomes is perfectly correlated with preferences. Thus, conservative voters are also wealthy voters: Y is an increasing function of v, and is now denoted $Y(v)$.

A voter's optimal contribution is determined from a first-order condition as in (6):

$$((v-\beta)^2-(v-\alpha)^2)\frac{1-s}{2n}-m'(Y(v)-c_v^A)\leq 0. \quad (15)$$

A similar equation holds for B's contributors:

$$((v-\alpha)^2-(v-\beta)^2)\frac{1-s}{2n}-m'(Y(v)-c_v^B)\leq 0. \quad (16)$$

Differentiation shows that c_v^B increases with v:

$$\frac{dc_v^B}{dv}=-\frac{(\beta-\alpha)(1-s)/n-Y'm''(Y-c_v^B)}{m''(Y-c_v^B)}\geq 0. \quad (17)$$

The more conservative the voter (hence, by assumption the richer the voter) the more he benefits from contributing to the candidate on the right. The preference effect and the income effect thus reinforce each other. As in the previous analysis, there generally exists a cutoff v^B so that only informed voters with ideal points to the right of the cutoff contribute to B.

In contrast, c_v^A is not, in general, a monotonic function of v:

$$\frac{dc_v^A}{dv} = -\frac{(\alpha-\beta)(1-s)/n - Y'm''(Y-c_v^A)}{m''(Y-c_v^A)}. \tag{18}$$

The income effect induces a voter with a higher v to contribute more, but the preference effect induces smaller contributions. We shall assume that, initially, the income effect dominates and then the preference effect dominates, so that (18) increases initially and then declines. This, in particular, implies that only voters with moderate preferences (hence, wealth) contribute: very liberal voters are too poor to contribute, and moderate voters gain too little from contributing to A.

Thus, let v_L^A and v_R^A denote the cutoff values, so that only those informed voters with ideal points to the right of v_L^A and to the left of v_R^A contribute to A: $v_L^A < v_R^A < v^B$.

Total contributions made to each of the candidates are

$$c_A(\alpha,\beta) = \int_{v_L^A}^{v_R^A} \left[Y(v) - h\left(((v-\beta)^2 - (v-\alpha)^2)\frac{1-s}{2n} \right) \right] dF(v), \tag{19}$$

and

$$c_B(\alpha,\beta) = \int_{v^B}^{1} \left[Y(v) - h\left(((v-\alpha)^2 - (v-\beta)^2)\frac{1-s}{2n} \right) \right] dF(v). \tag{20}$$

The first-order conditions for the candidates' optimal positions are obtained by differentiating with respect to α and β:

$$\begin{aligned} &\int_{v_L^A}^{v_R^A} -h'\left(\frac{((v-\beta)^2-(v-\alpha)^2)(1-s)}{2n} \right) \frac{(v-\alpha)(1-s)}{n} dF(v) \\ &+ \left[Y(v_R^A) - h\left(\frac{((v_R^A-\beta)^2-(v_R^A-\alpha)^2)(1-s)}{2n} \right) \right] f(v_R^A)\frac{\partial v_R^A}{\partial \alpha} \\ &- \left[Y(v_L^A) - h\left(\frac{((v_L^A-\beta)^2-(v_L^A-\alpha)^2)(1-s)}{2n} \right) \right] f(v_L^A)\frac{\partial v_L^A}{\partial \alpha} = 0 \end{aligned} \tag{21}$$

and

$$\int_{v^B}^{1} -h'\left(\frac{((v-\beta)^2-(v-\alpha)^2)(1-s)}{2n}\right)\frac{(v-\beta)(1-s)}{n}dF(v) \tag{22}$$
$$-\left[Y(v^B)-h\left(\frac{((v^B-\beta)^2-(v^B-\alpha)^2)(1-s)}{2n}\right)\right]f(v^B)\frac{\partial v^B}{\partial \beta}=0.$$

Note that from (6)

$$\frac{\partial v_k^A}{\partial \alpha}=\frac{v_k^A-\alpha}{\beta-\alpha+m''(Y(v))Y'(v)n/(1-s)}, \text{ for } k=L,R \tag{23}$$

and from (5)

$$\frac{\partial v^B}{\partial \beta}=\frac{\beta-v^B}{\beta-\alpha-m''(Y(v))Y'(v)n/(1-s)}. \tag{24}$$

Our assumption that eventually the preference effect dominates for contributions made to candidate A ensures that $\partial v_R^A/\partial\alpha>0$. Furthermore, comparing (23) and (24) shows that $\partial v^B/\partial\beta > -\partial v_L^A/\partial\alpha$ when evaluated at $\alpha=1-\beta$.

These observations imply that the left-hand side in (21) is smaller then the left-hand side in (22) when both are evaluated at $\alpha=1-\beta$. Note also that the second-order conditions imply that the left-hand side in (21) decreases in α, and that the left-hand side in (22) decreases in β. Therefore, in equilibrium the candidates adopt asymmetric positions, with $\alpha>1-\beta$: the position of the candidate on the left lies closer to the median than does the position of the candidate on the right.

The above also implies that whenever the respective distances from contributors to the candidates are equal, a contributor to candidate A contributes less than does a contributor to candidate B. Because in equilibrium the candidates must have equal chances of winning, it follows that aggregate contributions to candidate A are smaller than to candidate B. [3]

Thus, we obtain

Proposition 3 *When rich voters are more conservative voters, the equilibrium positions of the candidates will be skewed to the right. Aggregate contributions are smaller to the left-wing candidate than to the right-wing candidate.*

This result has an interesting implication, which concerns the effect of income redistribution from the rich to the poor. The redistribution would, of course, directly benefit the poor at the expense of the rich. In addition, candidates will change their positions in the direction preferred by the poor. Thus, a cap here is a politically divisive issue, opposed by the rich and favored by the poor.

[3] Note that the equilibrium is unique only up to the identity of the candidates.

6 Conclusion

This paper departs from standard models of political competition by assuming that a candidates aims to maximize contributions collected from the voters. As in most of the literature, citizens contribute to a candidate to increase that candidate's chances of winning. In contrast to the Downsian model, here the positions the candidates adopt differ. Moreover, when the incomes of voters differ, the willingness of the rich to make larger contributions than the poor moves the candidates to adopt positions the rich prefer. Our framework also allows studying the effect of setting caps on political contributions. We find that a cap on the contributions a voter may make reduces aggregate contributions and causes divergence in the candidates' platforms. Such a cap has two opposing effects on voters' welfare. It increases their consumption, but also increases political uncertainty. In general, therefore, the welfare analysis generates ambiguous results, although it indicates that a cap is more likely to be supported by the poor and opposed by the rich.

7 Notation

$\overline{c}$ Cap on contributions

c_i Contributions received by Candidate i, for $i = A, B$; Contribution made by voter with ideal point at v , for $i = v$

c_v^A Contribution by voter with ideal point at v to candidate A.

$F(x)$ Fraction of the population that has ideal points to the left of x.

$f(x)$ Probability density function of voters' ideal points.

n Number of voters

p Policy

s Fraction of contributions stolen by candidate

v^A Critical value such that informed voters with ideal points to to the left of v^A contribute to candidate A.

$\overline{v}^A$ Critical value such that with a cap on an individual's contribution, informed voters with ideal points to the left of $\overline{v}^A$ contribute to candidate A.

U_v^A Expected utility of voter with ideal point at v who contributes to candidate A

Y_v Income of voter with ideal point v

α Position of Candidate A

β Position of Candidate B

ϕ Fraction of voters initially informed about the positions of the two candidates

π Share of votes won by Candidate A.

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