

**Online Appendix to**  
**REFORM SUPPORT IN TIMES OF CRISIS:**  
**THE ROLE OF FAMILY TIES**  
**by Elias Brumm and Johannes Brumm**

**A LABOR MARKET AND SUPPORT FOR REFORM**

Our baseline model in Section IV is highly stylized for illustration purposes. In this Online Appendix we relax some of the assumptions previously made regarding the labor market setup, namely  $f = 0$ , and  $\Delta f = 0$ . We show that the model's results remain qualitatively unaffected when these values are changed.<sup>1</sup> To keep the analysis tractable, we continue to assume complete altruism and risk neutrality throughout this section. From the analysis in Sections IV and V, we know that the first assumption ( $\alpha = 1$ ) strengthens the results while the second one ( $\gamma = 0$ ) weakens them.

When we give up the assumptions made on  $f$  and  $\Delta f$ , the mixed family votes in favor of reform if and only if

$$(1-p_i^r)(1-p_o^r)2u(e_o) + (p_i^r(1-p_o^r) + (1-p_i^r)p_o^r)(2u(\frac{e_i+\Delta e_i+e_o}{2}) - d) + p_i^r p_o^r 2(u(e_i + \Delta e_i) - d) \geq \tag{A.1}$$

$$(1-p_i^n)(1-p_o^n)2u(e_o) + (p_i^n(1-p_o^n) + (1-p_i^n)p_o^n)(2u(\frac{e_i+e_o}{2}) - d) + p_i^n p_o^n 2(u(e_i) - d),$$

---

<sup>1</sup>Of course, our main result trivially breaks down when  $\Delta e_i = 0$  and  $\Delta f = 0$ , as there is no disadvantage of reform in this case and therefore no reason for any voter to oppose reform. If, however, either  $\Delta e_i$  is substantially below zero or  $\Delta f$  is substantially above zero, then our main finding is robust to changes of these and the other parameters.

where the probabilities  $p_i^r, p_o^r, p_i^n$ , and  $p_o^n$  are given in Section III. In the following Subsections A.1-A.2 we illustrate how our results change when we vary  $f$  and  $\Delta f$  separately (keeping the other parameter at its previous value) and also maintaining our assumptions on the remaining parameters:  $\Delta e_i = -0.05$ ,  $\Delta \eta = 0.05$ ,  $e_o = 1/3$ , and  $d = 0.1$ . In A.3 we consider scenarios in which we jointly vary all parameters of the model. In A.4 we relax the assumption that the impact of reform on  $\Delta e_i$  and  $\Delta \eta$  does not depend on the insider share  $\eta$ . Finally, in A.5 we verbally discuss one further assumption of our model, namely that the job market states of two family members are independent of each other.

## A.1 Labor market flexibility ex ante

The results in Section IV are derived for  $f = 0$  which means that all agents maintain their state of employment if reform is not implemented. Table A.1 illustrates how support for reform changes if we allow for labor market flexibility in the absence of reform. When raising  $f$  we keep the assumption that  $\Delta f = 0$ . The mixed family's objection to reform decreases slightly with increasing ex ante labor market flexibility. The intuition for this result is straightforward: the reason why agents vote against reform is to protect the high insider income. If this income is at risk anyway, even in the absence of reform, resistance against reform decreases as the potential gain associated with reform relatively outweighs the cost.

## A.2 Change in labor market flexibility

In Section IV, we assume that insiders keep their job for sure in case of reform (that is,  $f + \Delta f = 0$ ). Table A.2 shows that relaxing this assumption (while keeping  $f = 0$ ) does not change the qualitative implications of the model. However, the mixed family's support for reform is weaker the stronger is the impact of reform on labor market flexibility. The reason is that  $\Delta f > 0$  introduces a second cost of

TABLE A.1

Reform threshold as a function of ex ante labor market flexibility

$f$	$\Delta f$	Reform threshold $\tau$
0	0	48.3
10	0	47.9
20	0	47.1
30	0	45.4

All numbers in percent. Parameter values are  $e_o = 1/3$ ,  $d = 0.1$ ,  $\Delta e_i = -0.05$  and  $\Delta\eta = 0.05$ . A higher reform threshold implies a larger region of  $\eta$ -values for which reform is blocked.

reform: the insider might lose his job. While a higher  $\Delta f$  at the same time increases the outsider's chance to find a job, the impact on the job perspectives of the insider tends to dominate and the reform threshold therefore increases in  $\Delta f$ .

### A.3 Sensitivity for various parameter combinations

Table A.3 displays values of the reform threshold for different combinations of the parameters  $f$ ,  $\Delta f$ ,  $\Delta e_i$  and  $\Delta\eta$ , while we keep  $e_o = 1/3$  and  $d = 0.1$ . The results show that the reversal of the crisis hypothesis holds for all these combinations: The region in which the mixed family rejects reform does not disappear, formally  $\tau \in [1 - 1/\sqrt{2}, 1/\sqrt{2}]$ , irrespective of the chosen parameter combinations. The influence of  $f$  and  $\Delta f$  on the reform threshold is as in the extreme cases considered in A.1 and A.2, respectively. A higher  $\Delta\eta$  pushes the reform threshold considerably to the left, thereby reducing opposition to reform. This is intuitive as a reform leading to more

TABLE A.2

Reform threshold as a function of the change in labor market flexibility

$f$	$\Delta f$	Reform threshold $\tau$
0	0	48.3
0	25	49.5
0	50	49.7
0	100	49.8

All numbers in percent. Parameter values are  $e_o = 1/3$ ,  $d = 0.1$ ,  $\Delta e_i = -0.05$  and  $\Delta \eta = 0.05$ . A higher reform threshold implies a larger region of  $\eta$ -values for which reform is blocked.

jobs is obviously more attractive for voters. The opposite is true for  $\Delta e_i$  as already discussed in Section IV.

We also consider the case where  $f = 0$  and  $\Delta f = 1$ , i.e. there is no labor market mobility without reform and perfect mobility in case of reform. In this scenario our general result persists even if  $\Delta e_i = 0$ : The mixed family opposes reform (for low enough  $\eta$ ) only because of the risk of losing the insider job.

Finally, we analyze the sensitivity of our results with respect to the outsider income and the disutility of the insider job. As Table A.4 shows, the reform threshold is an increasing function of both variables. The reason is that an increase in any of the two variables makes the prospect to obtain an additional insider job through reform less attractive for the mixed family.

TABLE A.3

Reform threshold as a function of labor market characteristics

$f$	$\Delta f$	$\Delta e_i$	$\Delta \eta$	Reform threshold $\tau$
25	25	-3	3	49.2
25	25	-3	5	42.1
25	25	-5	3	57.1
25	25	-5	5	49.4
25	50	-3	3	49.6
25	50	-3	5	45.7
25	50	-5	3	53.7
25	50	-5	5	49.7
50	25	-3	3	49.1
50	25	-3	5	40.9
50	25	-5	3	58.4
50	25	-5	5	49.3
50	50	-3	3	49.6
50	50	-3	5	45.3
50	50	-5	3	54.1
50	50	-5	5	49.6
0	100	0	5	45.0
0	100	0	3	47.0
0	100	-3	5	47.8
0	100	-3	3	49.8

All numbers in percent. Parameter values are  $e_o = 1/3$  and  $d = 0.1$ . A higher reform threshold implies a larger region of  $\eta$ -values for which reform is blocked.

TABLE A.4

Reform threshold for varying outsider income and insider disutility

$e_o$	$d$	Reform threshold $\tau$
25	0	30
25	10	40
25	20	50
33.3	0	38.3
33.3	10	48.3
33.3	20	58.3
40	0	45
40	10	55
40	20	65

All numbers in percent. Parameter values are  $\Delta f = 0$ ,  $\Delta e_i = -0.05$  and  $\Delta \eta = 0.05$ . A higher reform threshold implies a larger region of  $\eta$ -values for which reform is blocked.

#### A.4 Insider share and effects of reform

We assume in the baseline model that the impact of reform on  $\Delta e_i$  and  $\Delta \eta$  does not depend on the insider share  $\eta$ . Importantly, this setup implies that the net social benefit of reform  $\Delta \eta(e_i + \Delta e_i - e_o - d) - \eta \Delta e_i$  is decreasing in the insider share  $\eta$ , which works in favor of the crisis hypothesis and thus against our non-monotonicity result. In other words, the baseline model is sufficient to demonstrate that an increase in the insider share can have opposing implications for the welfare effect of reform and the political support for reform — the first being decreasing and the second increasing

in  $\eta$ . However, it is certainly plausible that the impact of a labor market reform on insider wages and the number of insider jobs depends on  $\eta$ . If anything,  $\Delta e_i$  and  $\Delta \eta$  should both be decreasing in  $\eta$ . While the first effect would work in the direction of our non-monotonicity result, the second would work in the opposite direction. We therefore now consider a modification of the baseline setup where only this second effect is present, namely  $\Delta \eta = g(\eta)$  with  $g'(\eta) < 0$ . Following the derivation of Proposition 1, it is easy to show that for  $\alpha = 1$ ,  $\gamma = 0$ , and  $0 > g'(\eta) > \Delta e_i / (e_i + \Delta e_i - e_o - d)$ , reform is implemented if and only if  $\eta \in [0, 1 - 1/\sqrt{2}] \cup [\tau, 1/\sqrt{2}]$ , where  $\tau$  is the solution to  $\tau = 1 + (g(\tau)/\Delta e_i)(e_i + \Delta e_i - e_o - d)$ . Thus, as long as  $\Delta \eta$  does not decrease too fast in  $\eta$  (for our baseline  $g'(\eta) > \approx -9.7$  percent) ensuring that  $p_o^r$  is still increasing in  $\eta$ , the qualitative results of the baseline model remain unaffected. Moreover, in a setup where both  $\Delta \eta$  and  $\Delta e_i$  decrease in  $\eta$ , our non-monotonicity result can hold even if  $p_o^r$  is decreasing in  $\eta$ . Finally, note that in cases where the majority vote under altruism is monotone in  $\eta$ , the voting behavior can nevertheless differ substantially from the individualistic case. In particular, opposition to reform can still be much stronger in the altruistic case.

## A.5 Correlation of employment states

Throughout the paper, we assume that the employment states of members of the same family are uncorrelated. This assumption may seem oversimplifying, but we think that it is not essential for the analysis. On the one hand, consider the extreme of perfect positive correlation between the family members' employment states. In this case there would be no mixed families in the economy and altruism would obviously have no effect on voting. On the other hand, assuming perfect negative correlation implies that society is exclusively inhabited by mixed families who then trivially become the median voter for all values of  $\eta$ . Apparently, these two extremes seem to be irrelevant in reality. We think that in many societies, especially those in a

crisis situation, the mixed family does indeed play an important role. In Spain, for instance, labor market dualism leads to a situation where many insider parents have outsider children (see Bentolila et al., 2012).

## B MATHEMATICAL DETAILS

### B.1 Incomplete altruism

In this section, we derive the results regarding incomplete altruism that are illustrated in Figure 4. The location of the dashed lines indicating changes in the median voter family types does not depend on altruism. The median voters are first (o,o), then (o,i), then (i,o), and finally (i,i). In contrast, it is non-trivial to derive the location of the solid lines that indicate the indifference lines of agents of types (o,i) and (i,o) – that is to say, outsider and insider members of mixed families. Agents of type (o,i) vote in favor of reform if and only if

$$\begin{aligned} & (1 - p_o^r) \cdot (e_o + \alpha(e_i + \Delta e_i - d)) + p_o^r \cdot (1 + \alpha) \cdot (e_i + \Delta e_i - d) \\ & \geq e_o + \alpha \cdot (e_i - d), \end{aligned}$$

which simplifies (for the considered parameters  $e_o = 1/3$ ,  $d = 0.1$ ,  $\Delta e_i = -0.05$  and  $\Delta \eta = 0.05$ ) to  $\eta \geq 1 - 31/(60 \cdot \alpha)$ . Thus, the indifference line of insider members of mixed families, (o,i), is given by  $\eta = 1 - 31/(60 \cdot \alpha)$ .

Agents of type (i,o) vote in favor of reform if and only if

$$\begin{aligned} & (1 - p_o^r) \cdot (\alpha e_o + (e_i + \Delta e_i - d)) + p_o^r \cdot (1 + \alpha) \cdot (e_i + \Delta e_i - d) \\ & \geq \alpha e_o + e_i - d, \end{aligned}$$

which simplifies to  $\eta \geq 1 - (31 \cdot \alpha)/60$ . Thus, the indifference line of outsider members of mixed families, (o,i), is given by  $\eta = 1 - (31 \cdot \alpha)/60$ .

## B.2 Risk aversion

We now derive the results regarding the reform threshold under risk aversion that are reported in Section V. Observe that, for  $\alpha = 1$ , consumption is equalized across family members which simplifies the derivation considerably. The mixed family is indifferent between reform and no reform if and only if:

$$\begin{aligned} (1 - p_o^r) \cdot \left( 2u\left(\frac{e_o + e_i + \Delta e_i + 2w}{2}\right) - d \right) + p_o^r \cdot 2u(e_i + \Delta e_i + w - d) \\ = \\ 2u\left(\frac{e_o + e_i + 2w}{2}\right) - d. \end{aligned} \tag{B.1}$$

Plugging in  $p_o^r = \Delta\eta/(1 - \eta)$ , as well as  $e_o = 1/3$ ,  $w = 0$ ,  $d = 0.1$ ,  $\Delta\eta = 0.05$ ,  $\Delta e_i = -0.05$ , and a value for  $\gamma$ , we can solve for  $\eta$ , which is the reform threshold.

Table 2 provides the results for several different risk-aversion parameters  $\gamma$ .

In Figure 5 we plot the values of  $\eta$  that solve Equation B.1, when  $\gamma = 2$  and wealth  $w$  varies. The solution is given by the following function of wealth  $w$ :

$$\eta = (-41726 - 39629w - 16260w^2 - 7200w^3)/(-68400 - 72000w).$$

## C DATA SOURCES

### C.1 Index of labor freedom

The description of the index is based on information provided on the Heritage Foundation's website: [www.heritage.org/index/book/methodology](http://www.heritage.org/index/book/methodology). Following this link, a complete description of all ten index components of the Heritage Foundation's 'Index of Economic Freedom' can be found. Since our work only uses the sub-indicator 'Labor Freedom', we describe this component here.

The labor freedom sub-indicator is a quantitative measure that considers various

aspects of the legal and regulatory framework of a country's labor market, including regulations concerning minimum wages, laws inhibiting layoffs, severance requirements, and measurable regulatory restraints on hiring and hours worked. Six quantitative factors are equally weighted: Ratio of minimum wage to the average value added per worker; hindrance to hiring additional workers; rigidity of hours; difficulty of firing redundant employees; legally mandated notice period; mandatory severance pay.

Based on data collected in connection with the World Bank's Doing Business report, these factors specifically examine labor regulations that affect the hiring and redundancy of workers and the rigidity of working hours. In constructing the labor freedom score, each of the six factors is converted to a scale of 0 to 100. A country's overall labor freedom score is then simply obtained by averaging the converted values of the six factors. Unless otherwise noted, the index relies on the following sources for data on labor freedom, in order of priority: World Bank, Doing Business; International Labor Organization, Statistics and Databases; World Bank, World Development Indicators; Economist Intelligence Unit, Country Commerce; U.S. Department of Commerce, Country Commercial Guide; and official government publications of each country.

Also note that, the index value of, for instance 2014, is based on data for the period covering the second half of 2012 through the first half of 2013. Therefore, in Section II, we report the index data lagged by one year to make them comparable to the youth unemployment data provided in Figure 1.

## **C.2 Family ties**

The description of the data sources is based on Alesina and Giuliano (2011), who provide the index values of family ties reported in Section II. This index is based on data of the World Values Survey (WVS) (see [www.worldvaluessurvey.org](http://www.worldvaluessurvey.org) for a

comprehensive description of the survey project).

The WVS is composed of national surveys on values and norms on a wide variety of topics, carried out four times (1981–1984, 1990–1993, 1995–1997, and 1999–2004). The questionnaires contain information on different types of attitudes, religion, and preferences, as well as information on demographic characteristics (gender, age, education, labor market status, income, etc.).

The strength of family ties is measured by looking at three variables from the WVS, which capture beliefs regarding the importance of the family in the respondent's life, the duties and responsibilities of parents and children, and love and respect for one's own parents. The first question assesses how important the family is in one person's life and can take values from 1 to 4 (with 1 being *very important* and 4 *not important at all*). The second question asks whether the respondent agrees with one of the two statements (taking the values of 1 and 2 respectively).

- Regardless of what the qualities and faults of one's parents are, one must always love and respect them.
- One does not have the duty to respect and love one's parents if they have not earned such respect and love.

The third question prompts respondents to agree with one of the following statements (again taking the values of 1 and 2 respectively).

- It is the parents' duty to do their best for their children even at the expense of their own well-being.
- Parents have a life of their own and should not be asked to sacrifice their own well-being for the sake of their children.

These measures are combined in two ways. First, the sum of all of them is taken and the variables are recoded such that a higher number corresponds to stronger family

ties. Second, the first principal component is extracted from the whole data set with all individual responses for the original variables. This approach yields the index values of family ties we report in Section II.