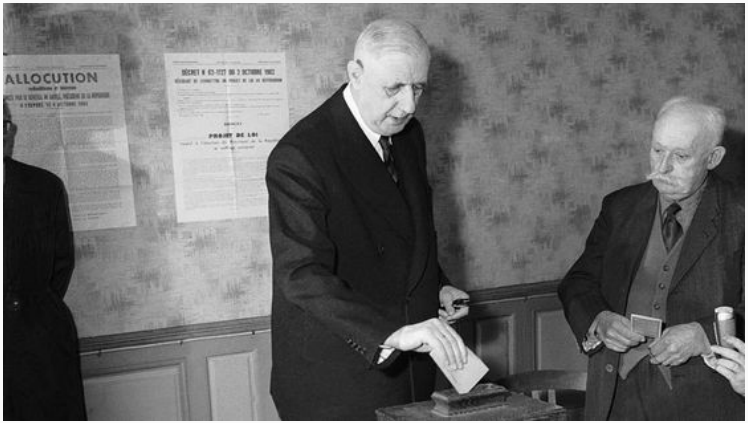
# Voter Autrement 2022

How do people react to alternative voting methods?

vote.imag.fr

Théo Delemazure

June 6th 2023 - Lamsade Day




**Every 5 years**, we have a tradition in France...

# The other, less known, tradition...

Strasbourg, Salle de la Bourse. Crédit A. Baujard

**Their message:** there is more than *one* way to vote!

# The team

**Antoinette Baujard**
(Université Jean Monnet, GATE)

**Herrade Igersheim**
(CNRS, Université de Strasbourg)

**Jean-François Laslier**
(CNRS, Paris School of Economics)

**Isabelle Lebon**
(Normandie Université, CREM)

**Jérôme Lang**
(CNRS, Université Paris Dauphine)

**Sylvain Bouveret**
(Université de Grenoble)

and others...

# The 2022 election: candidates

# Three different experiments:

1. **In situ** experiment
2. Poll on a **representative subset** of the population
3. **Online experiment** open to everyone

# Three different experiments:

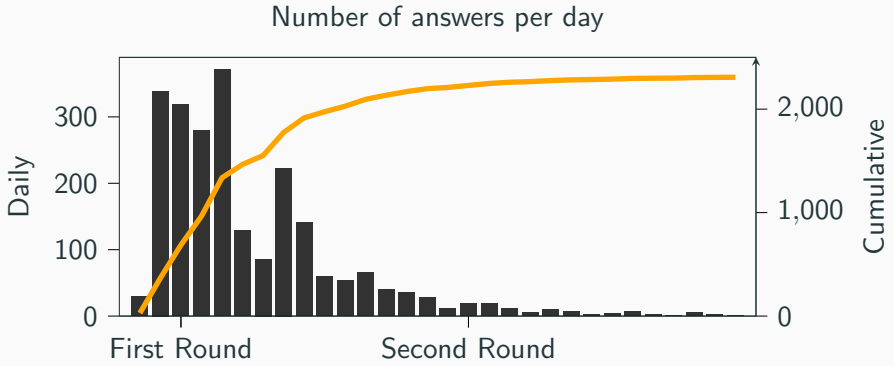
1. **In situ** experiment

2. Poll on a **representative subset** of the population

3. **Online experiment open to everyone**

# Quick demo

vote.imag.fr



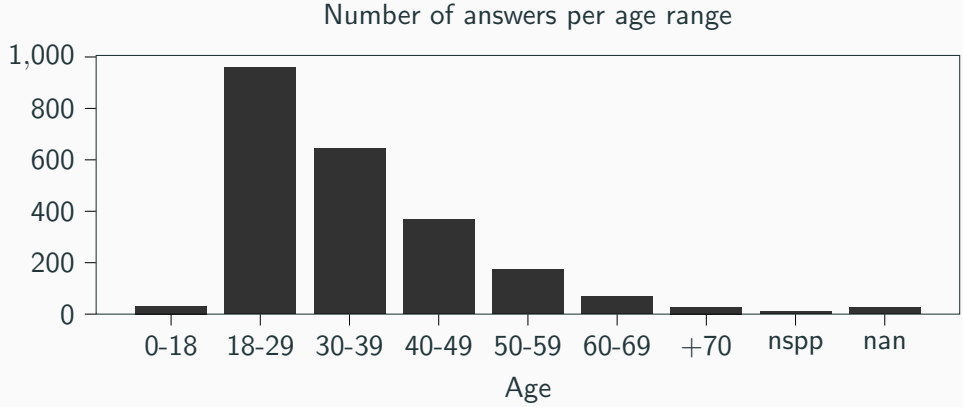

**2308 responses** between April 8th and June 7th

**Reminder:** first round was April 10th, second round was April 24th

# 1. Who are the participants?

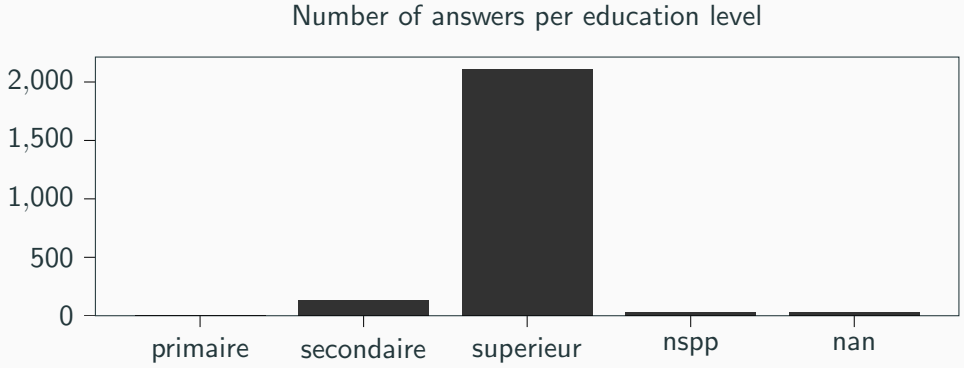
# Not a diverse socio-demographic pool

- 70% are **under 40 years old**. (30% in general population)



# Not a diverse socio-demographic pool

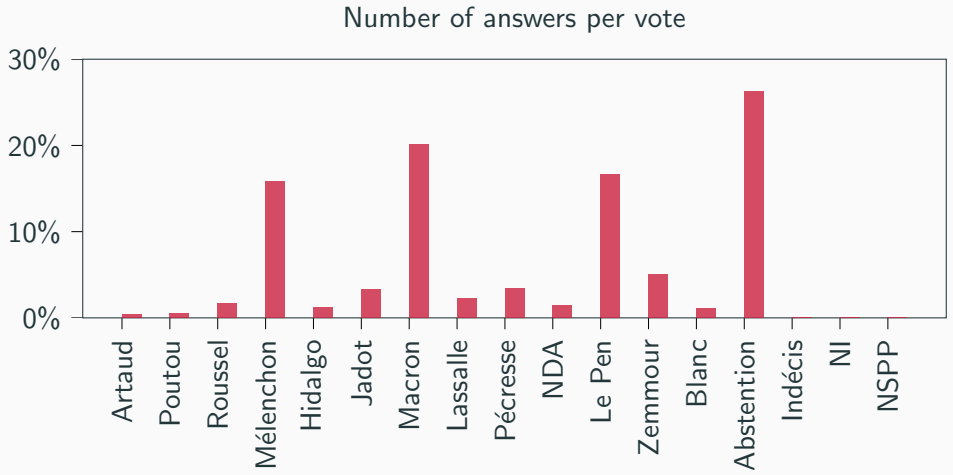
- 70% are **under 40 years old**. (30% in general population)
- 90 % have a degree **"études supérieures"**. (50 % in general population)



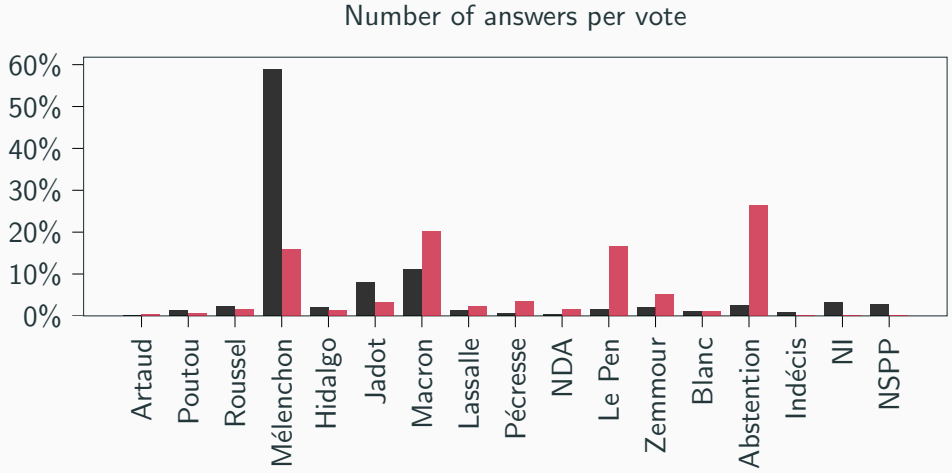
# Not a diverse socio-demographic pool

- 70% are **under 40 years old**. (30% in general population)
- 90 % have a degree **"études supérieures"**. (50 % in general population)
- 2/3 of participants are **men**.

# Not a diverse political pool



# Not a diverse political pool



## So... can we actually do **anything** with this biased data?

- We can try to **debias the answers** as much as possible by **adjusting the weights** of the participants.
- There is a lot to analyse **beyond the winners** of the alternatives methods, like the **behaviour of the participants**, and **their satisfaction** with the various voting rules.

**Keep in mind:** the data is still biased, so consider the results with caution.

# 2. Data analysis

# 2.1. Approval voting

$n = 1382$ responses

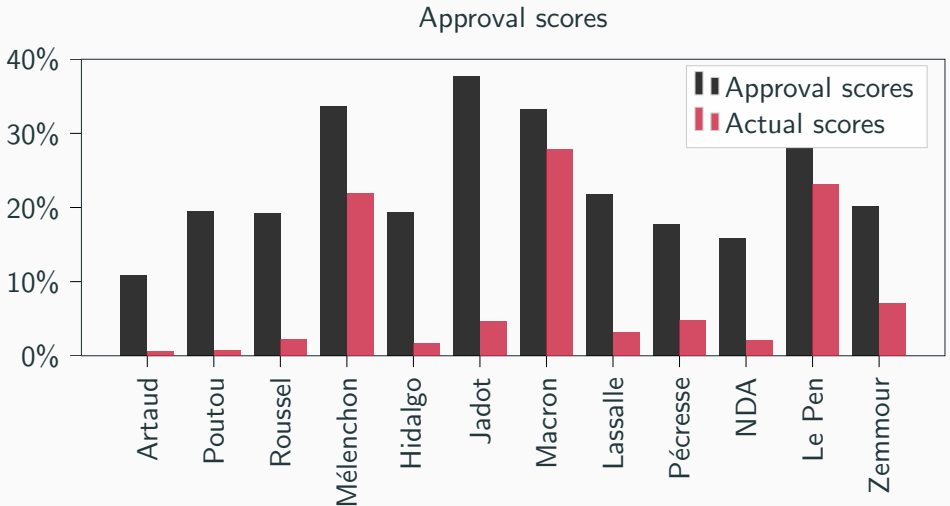
## Approval ballot

| | |
|---|---|
| Candidate 1 | ☑ |
| Candidate 2 | ☐ |
| Candidate 3 | ☑ |
| Candidate 4 | ☑ |
| Candidate 5 | ☐ |
| Candidate 6 | ☐ |

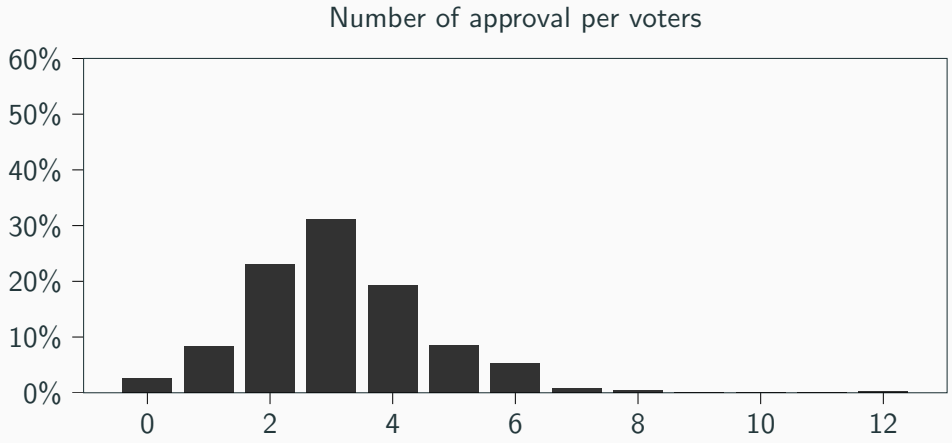
# Approval voting: where is it used?

**Used** in some US cities (Saint-Louis, Fargo, etc.) and for low-stakes election everywhere.

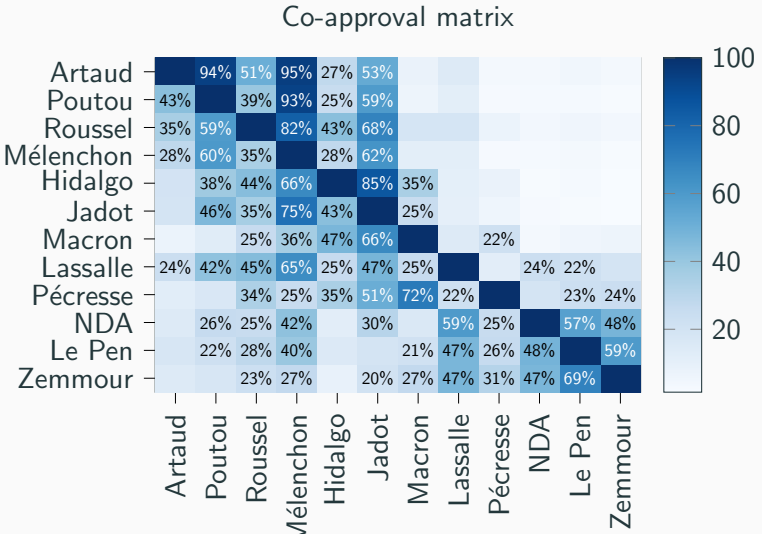
# Approval voting: results



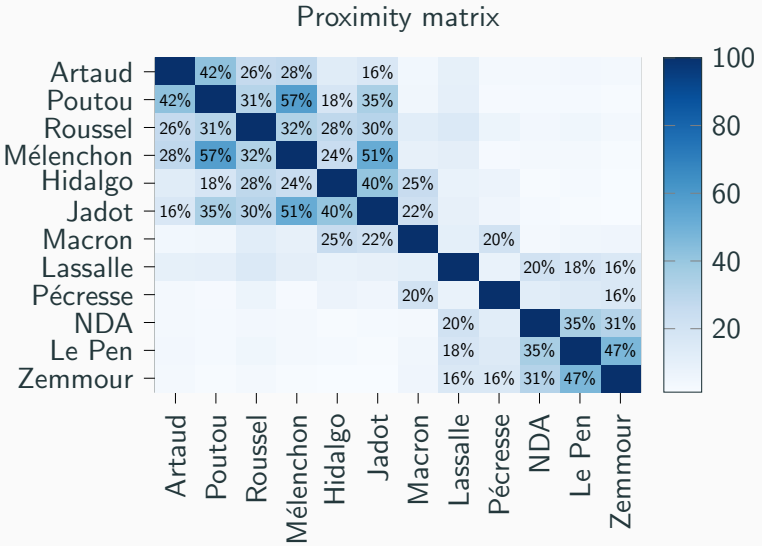
# Number of approvals



# Co-approval matrix

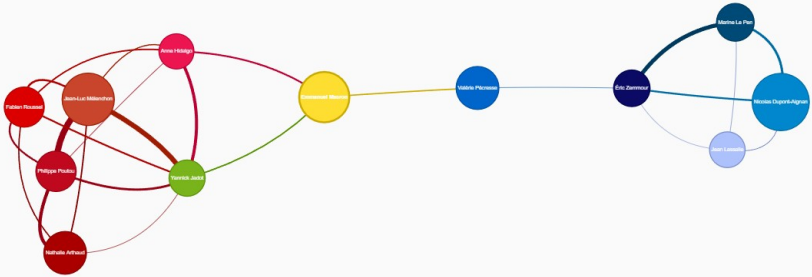


# Proximity matrix (Jaccard index)



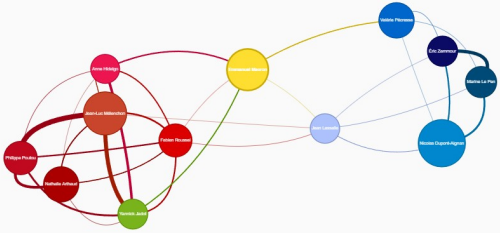
# Proximity network (Jaccard index)

**Proximity threshold:** 0.15



# Proximity network (Jaccard index)

**Proximity threshold:** 0.1



# 2.2. Score voting

$n \sim 900$ responses per score scale

## Score ballot

| | 0 | 1 | 2 |
|---|---|---|---|
| Candidate 1 | ☐ | ☐ | ☑ |
| Candidate 2 | ☐ | ☑ | ☐ |
| Candidate 3 | ☑ | ☐ | ☐ |
| Candidate 4 | ☑ | ☐ | ☐ |
| Candidate 5 | ☐ | ☐ | ☑ |
| Candidate 6 | ☑ | ☐ | ☐ |

## Score ballot

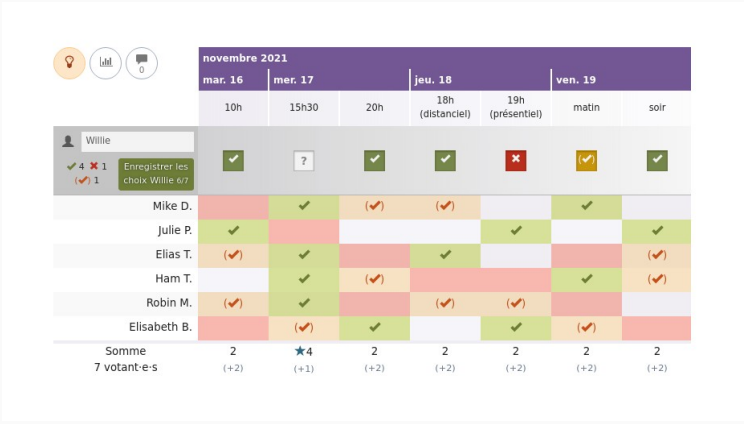
| | -1 | 0 | 1 |
|---|---|---|---|
| Candidate 1 | ☐ | ☐ | ☑ |
| Candidate 2 | ☐ | ☑ | ☐ |
| Candidate 3 | ☑ | ☐ | ☐ |
| Candidate 4 | ☑ | ☐ | ☐ |
| Candidate 5 | ☐ | ☐ | ☑ |
| Candidate 6 | ☑ | ☐ | ☐ |

## Score ballot

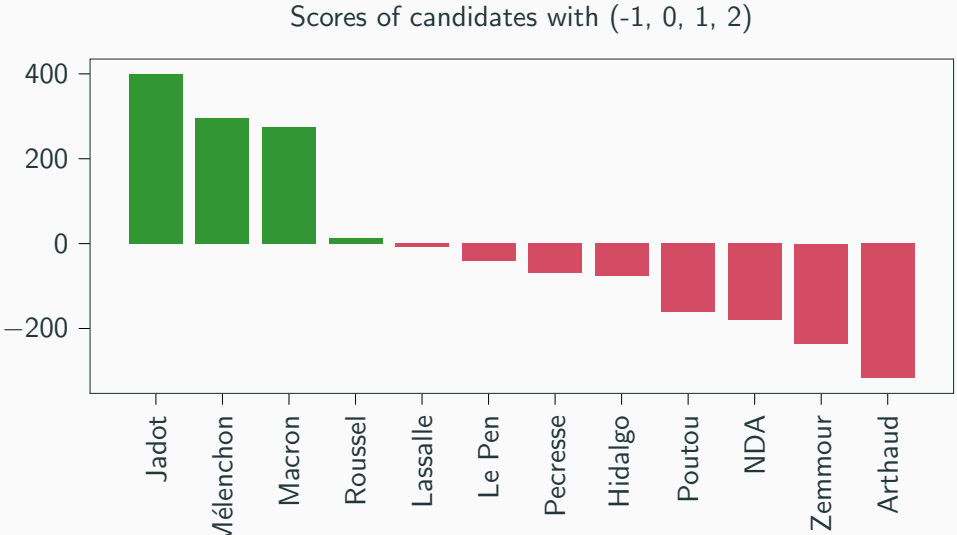
| | -1 | 0 | 1 | 2 |
|---|---|---|---|---|
| Candidate 1 | ☐ | ☐ | ☐ | ☑ |
| Candidate 2 | ☐ | ☑ | ☐ | ☐ |
| Candidate 3 | ☑ | ☐ | ☐ | ☐ |
| Candidate 4 | ☐ | ☑ | ☐ | ☐ |
| Candidate 5 | ☐ | ☐ | ☐ | ☑ |
| Candidate 6 | ☑ | ☐ | ☐ | ☐ |

# Score voting: where is it used ?

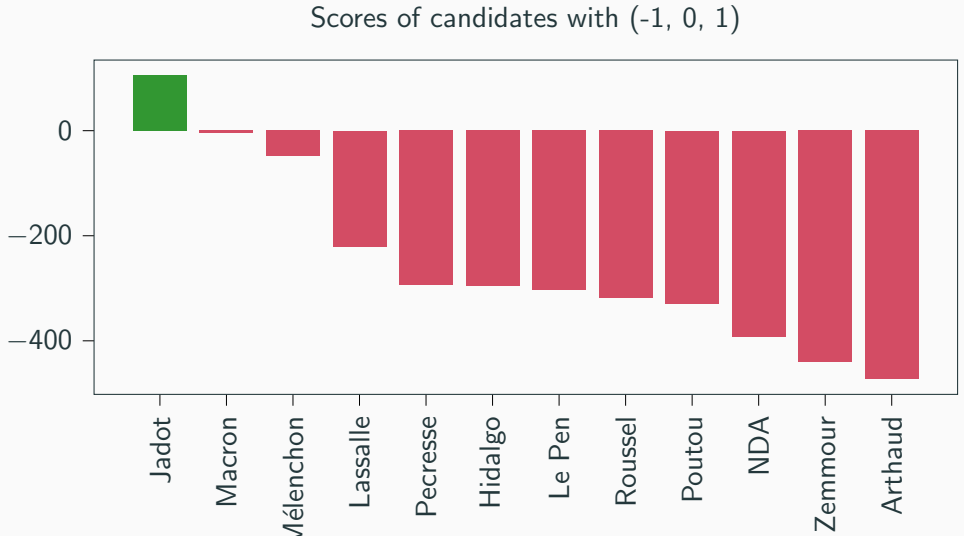
**Used** for parliament in Latvia, for secretary general at the UN, for choosing a meeting date (Framadate, Doodle or `whale.imag.fr`), etc.



# Score voting: results



# Score voting: results



# 2.3. Ranking-based methods

$n \sim 750$ responses for each method

## Ranking ballot

| | Ranking |
|---|---|
| #1 | Candidate 3 |
| #2 | Candidate 1 |
| #3 | Candidate 5 |
| #4 | Candidate 2 |

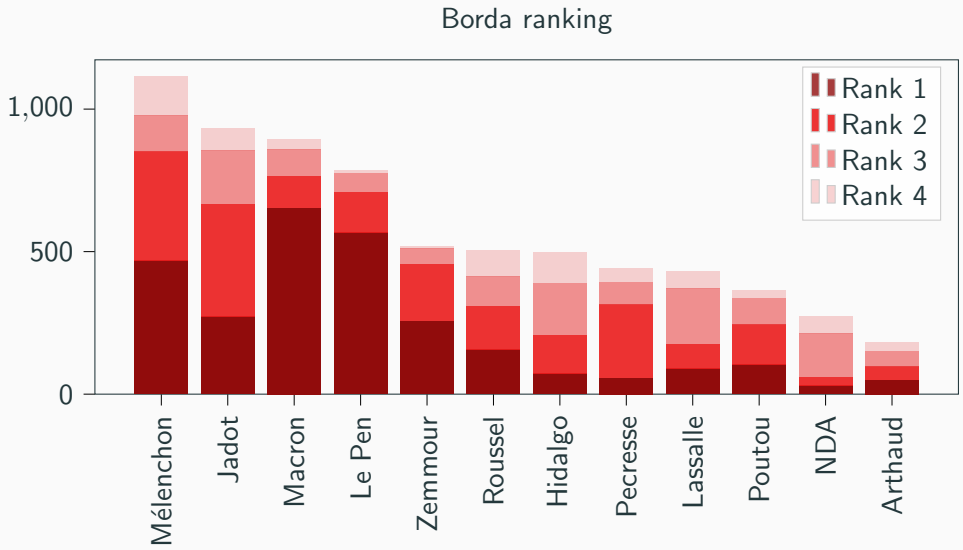
## Ranking ballot

| | Borda score |
|---|---|
| #1 | +4 points |
| #2 | +3 points |
| #3 | +2 points |
| #4 | +1 points |
| ··· | 0 points |

# Borda: where is it used?

**Used** in Slovenia (for two deputies) and in Micronesian nations of Naura and Kiribati, as well as many low-stakes elections (e.g. the Eurovision).

# Borda: results



# Instant Runoff Voting (IRV, STV)

| | Ranking |
|---|---|
| #1 | Candidate 3 |
| #2 | Candidate 1 |
| #3 | Candidate 5 |
| #4 | |
| #5 | |
| #6 | |

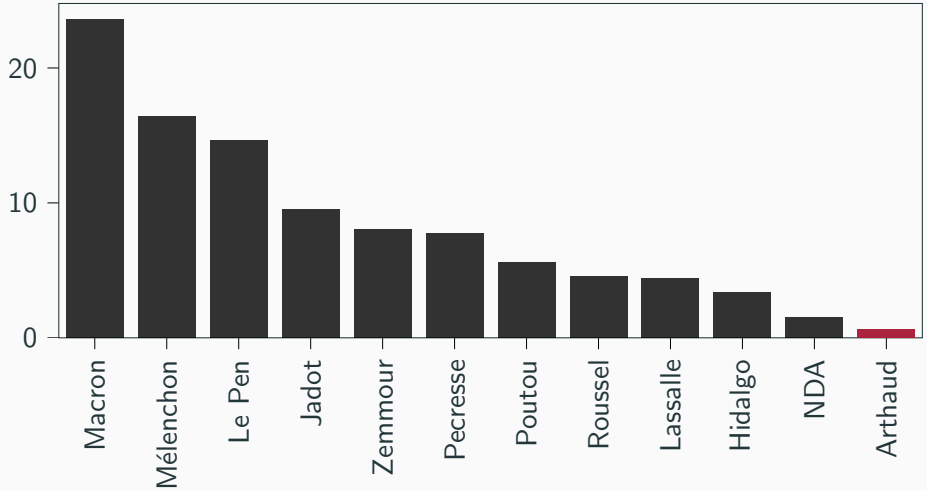
# Instant Runoff Voting (IRV, STV)

| | Ranking |
|---|---|
| #1 | Candidate 1 |
| #2 | Candidate 5 |
| #3 | |
| #4 | |
| #5 | |
| #6 | |

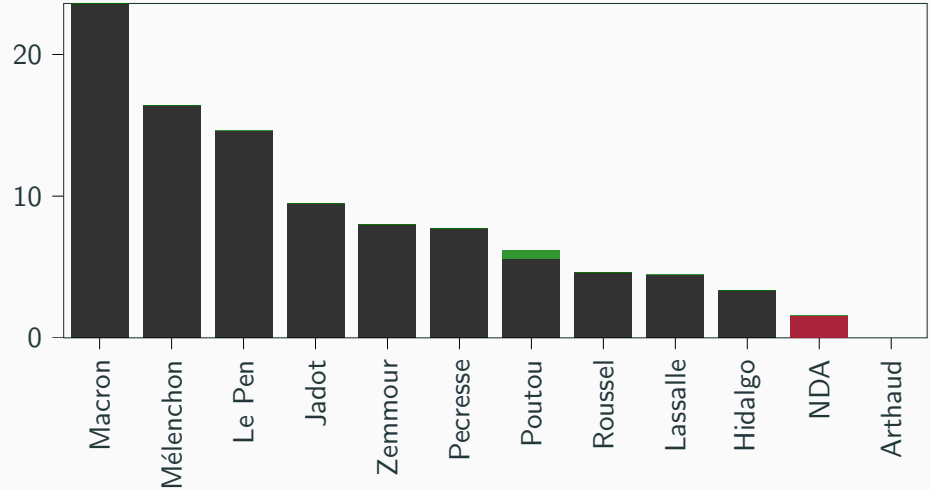
# IRV: where is it used?

**Used** in Australia, Ireland, Papua New Guinea, Maine (USA), etc.

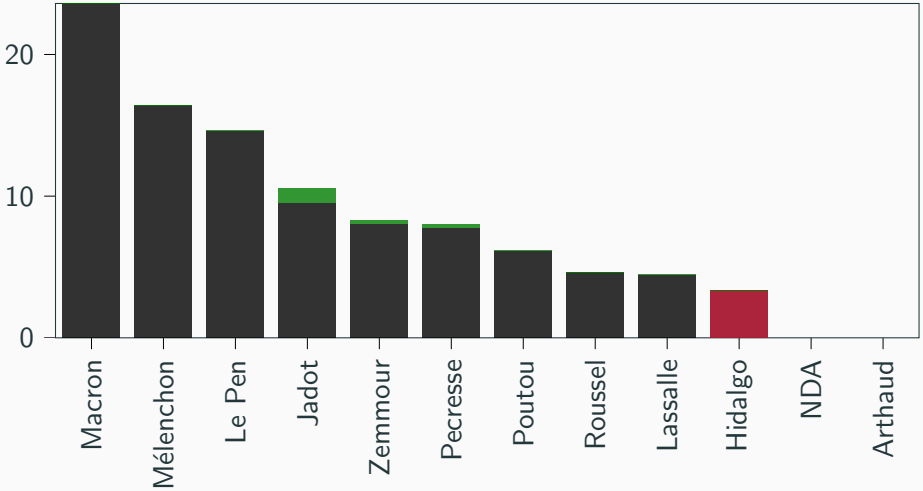
# IRV: results


20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

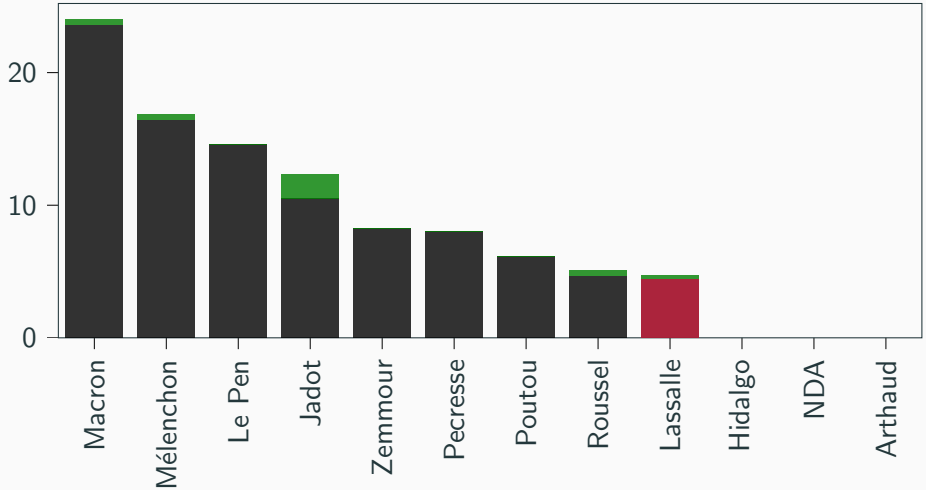
# IRV: results


20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

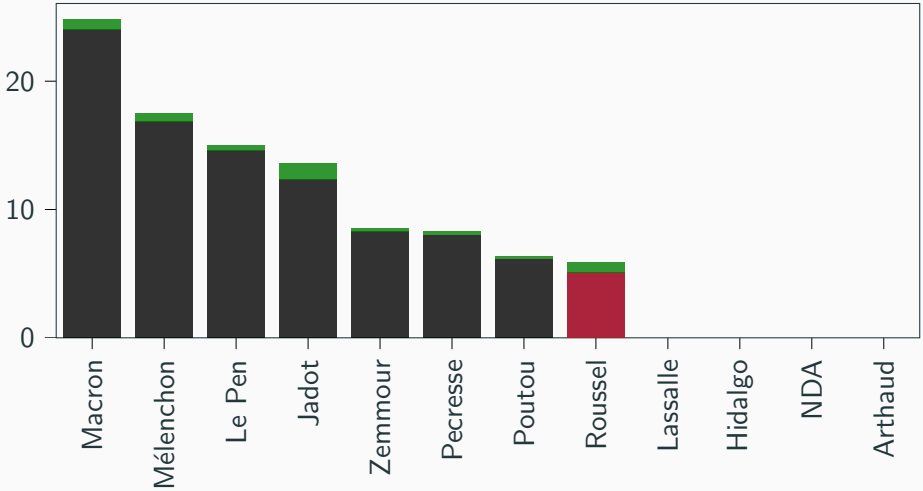
# IRV: results


20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

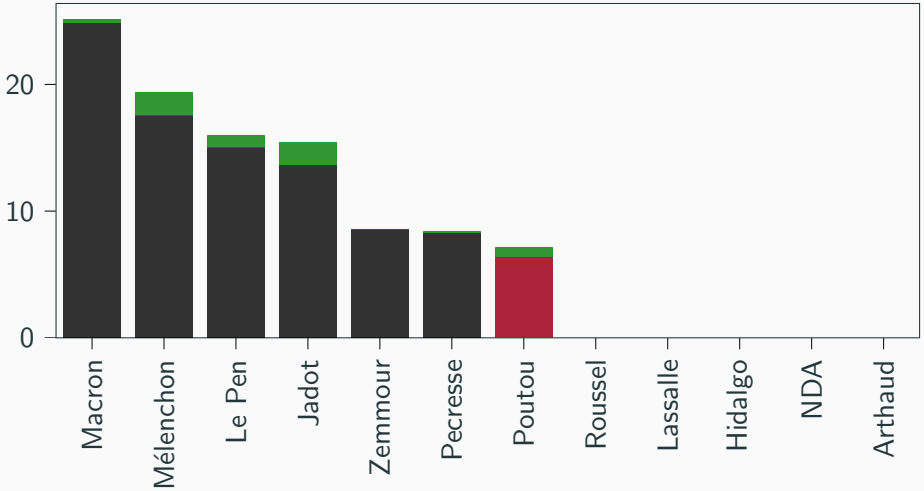
# IRV: results


20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

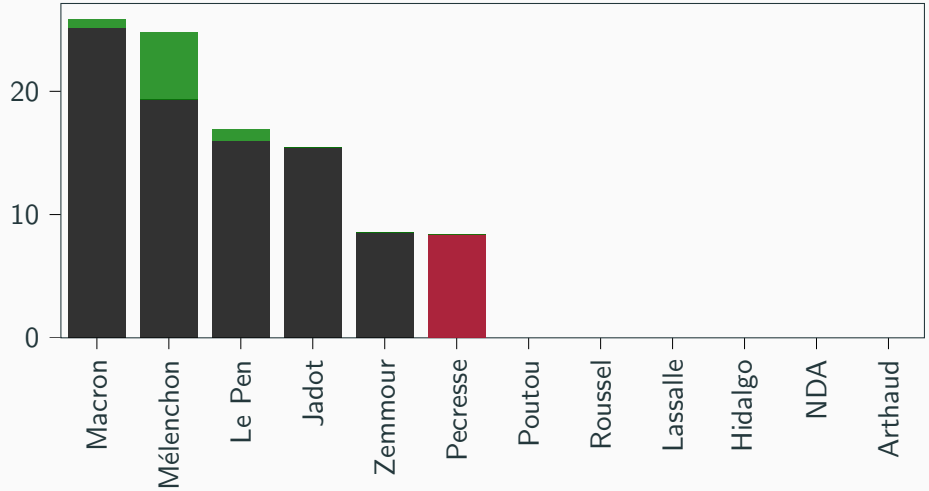
# IRV: results


20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

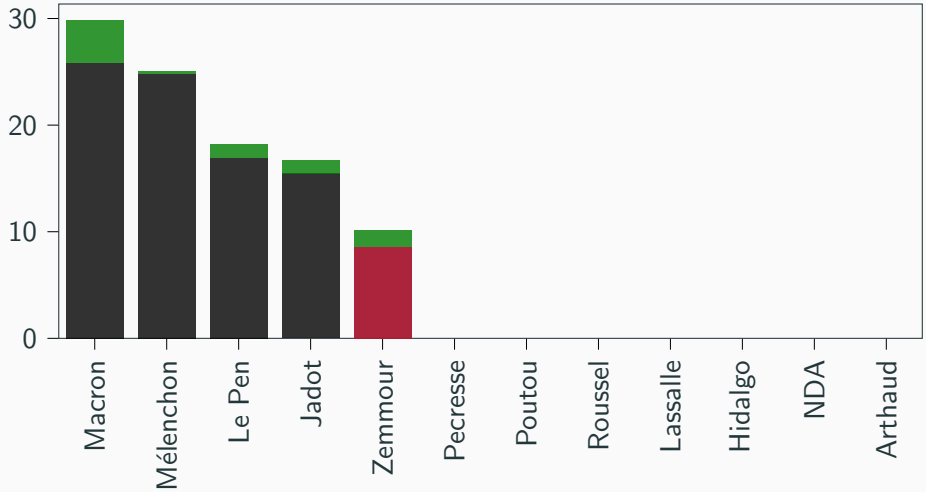
# IRV: results


20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

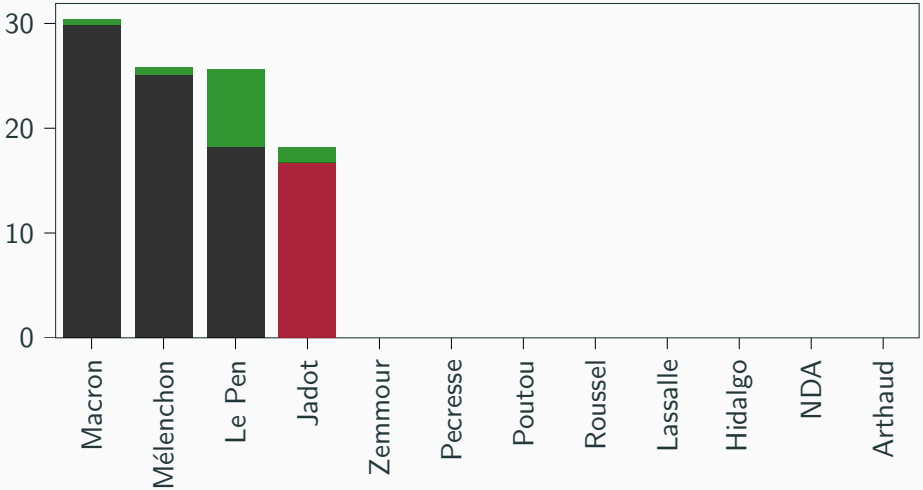
# IRV: results


20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

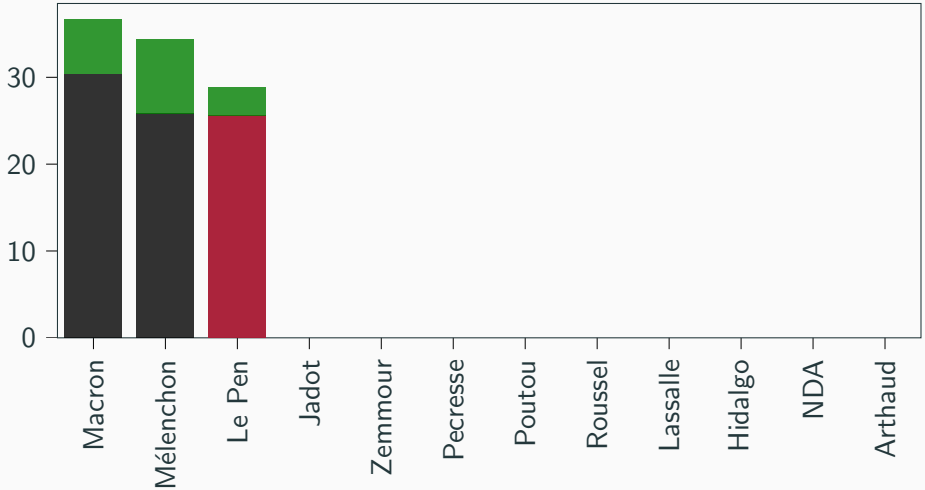
# IRV: results


30
20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

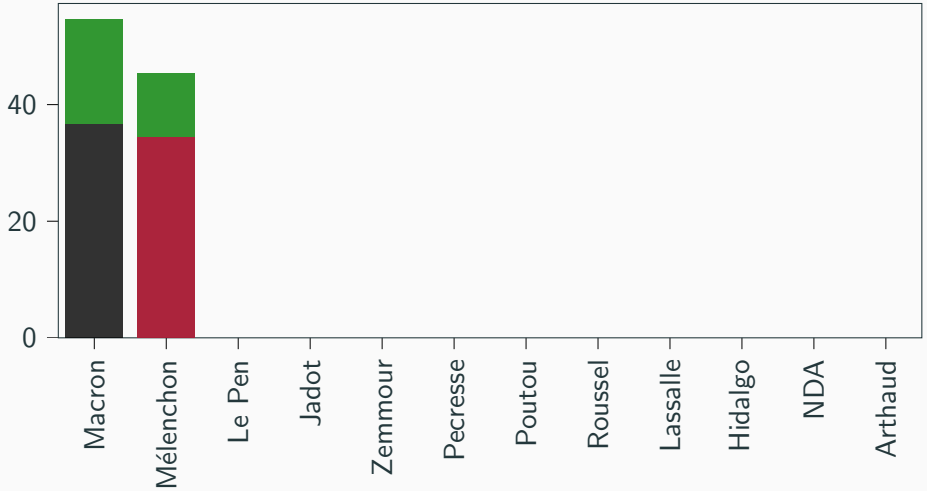
# IRV: results


30
20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

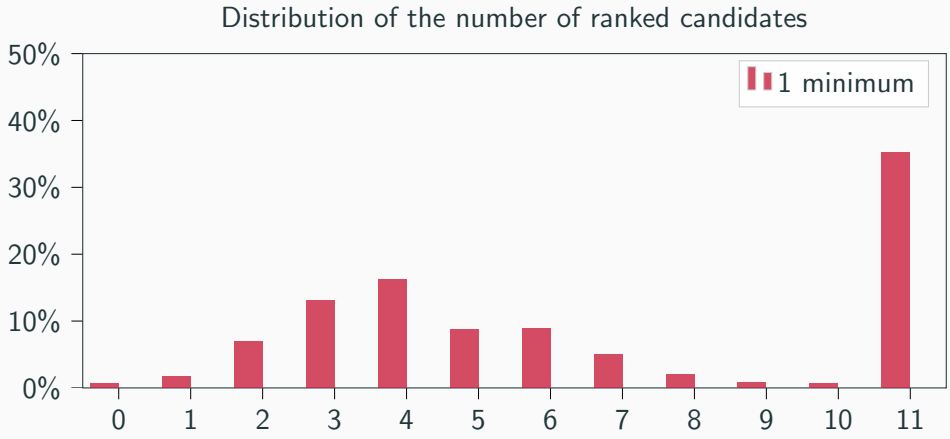
# IRV: results


30
20
10
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

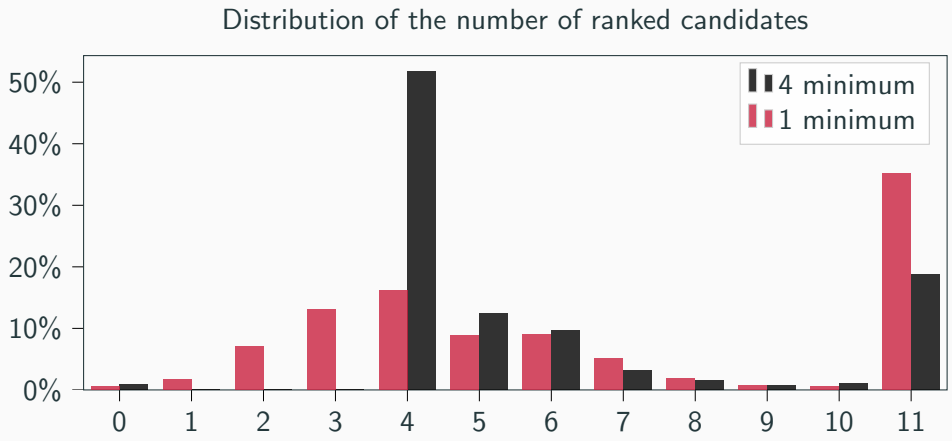
# IRV: results


40
20
0
Macron
Mélenchon
Le Pen
Jadot
Zemmour
Pecresse
Poutou
Roussel
Lassalle
Hidalgo
NDA
Arthaud

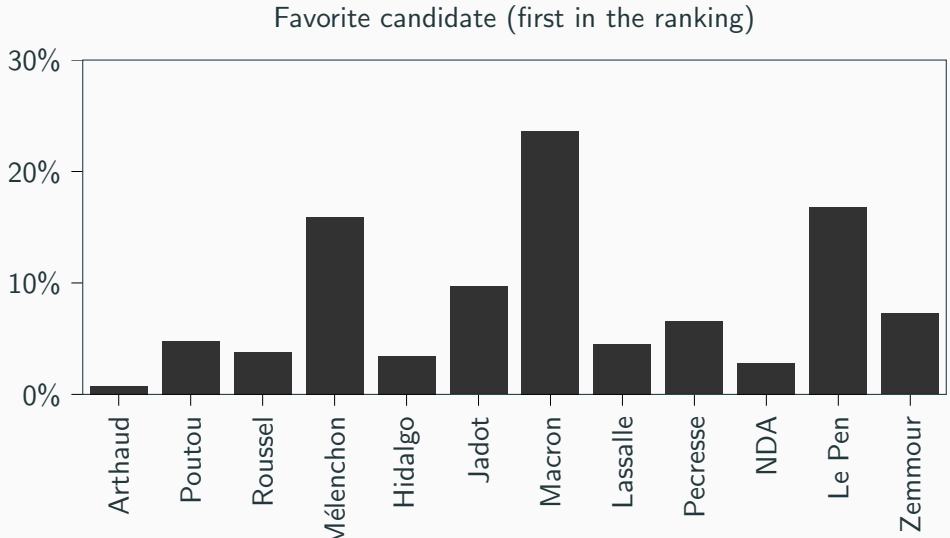
# How many candidates are ranked ?



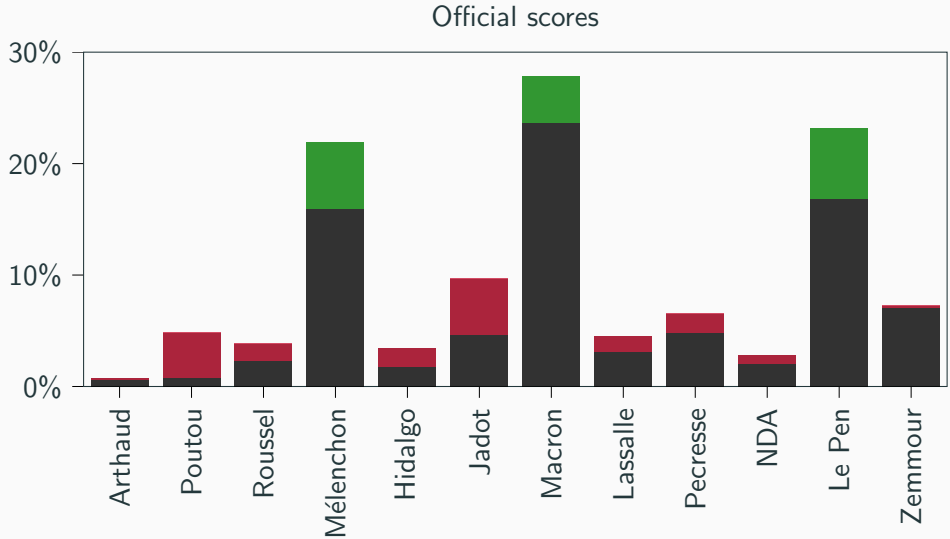
# How many candidates are ranked ?



# Strategic voting ("Vote utile")



# Strategic voting ("Vote utile")



# 2.4. Majority Judgement

$n \sim 1500$ responses for both variants

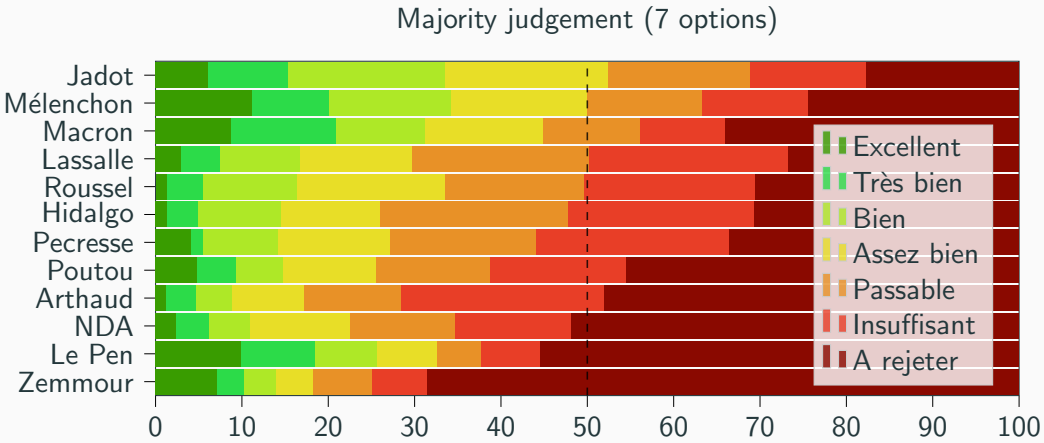
## Majority judgement ballot

| | Insuffisant | Passable | Assez Bien | Bien | Très Bien |
|---|---|---|---|---|---|
| Candidate 1 | ☐ | ☐ | ☐ | ☑ | ☐ |
| Candidate 2 | ☐ | ☐ | ☐ | ☑ | ☐ |
| Candidate 3 | ☐ | ☑ | ☐ | ☐ | ☐ |
| Candidate 4 | ☑ | ☐ | ☐ | ☐ | ☐ |
| Candidate 5 | ☐ | ☑ | ☐ | ☐ | ☐ |
| Candidate 6 | ☐ | ☐ | ☐ | ☐ | ☑ |

# Majority judgement: where is it used?

**Used** for participatory budgeting in Paris, and other low-stakes elections.

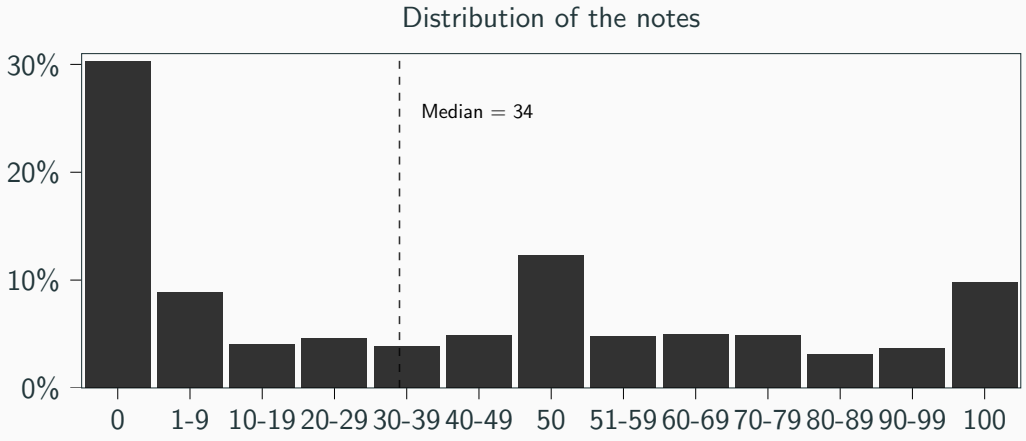
# Majority judgement: results



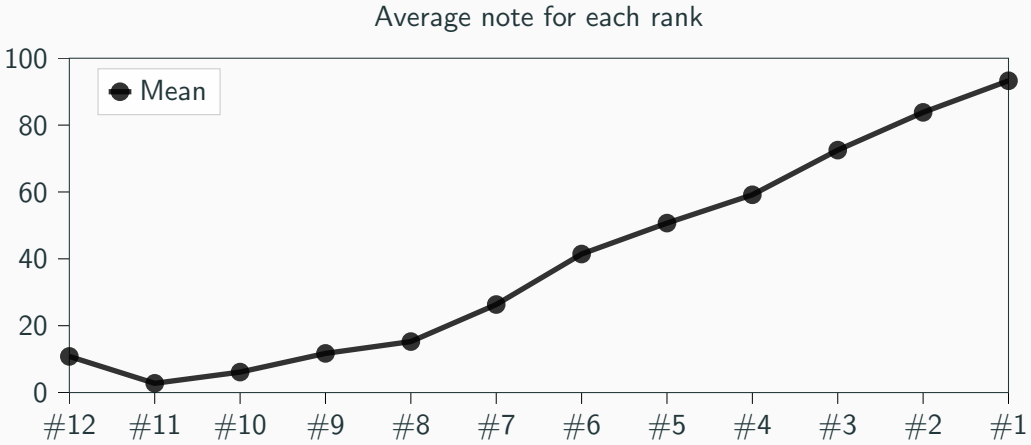
# 3. Opinions on candidates

Candidate 1

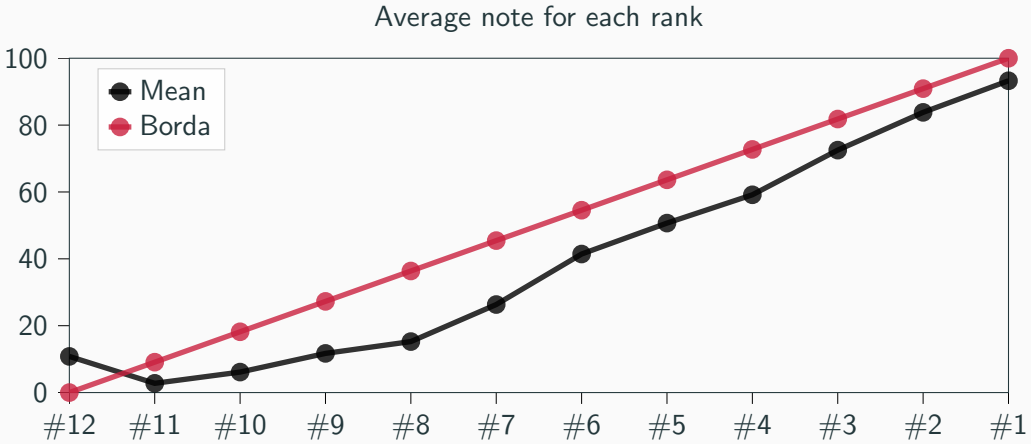
# Distribution of notes



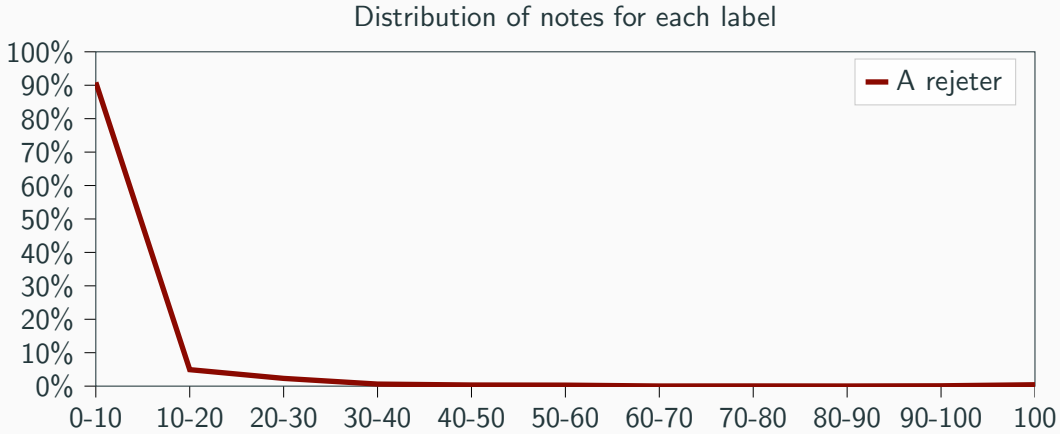
# Opinion and ranking



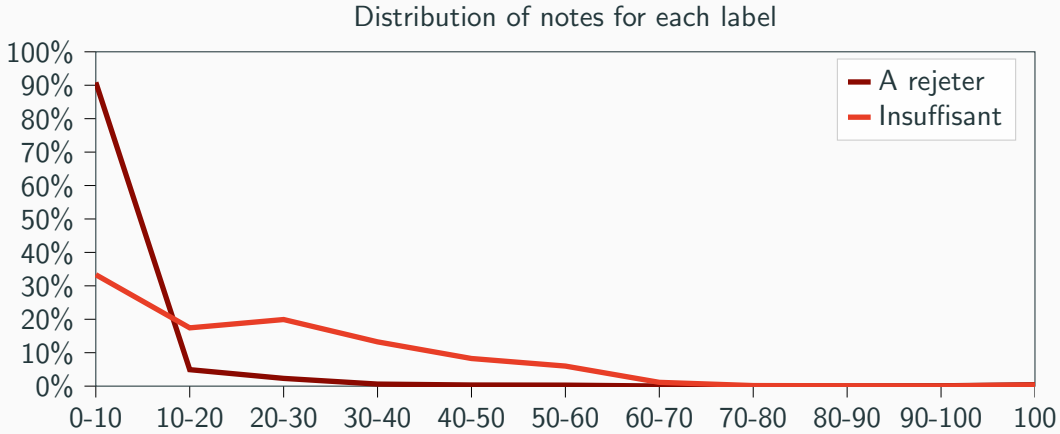
# Opinion and ranking



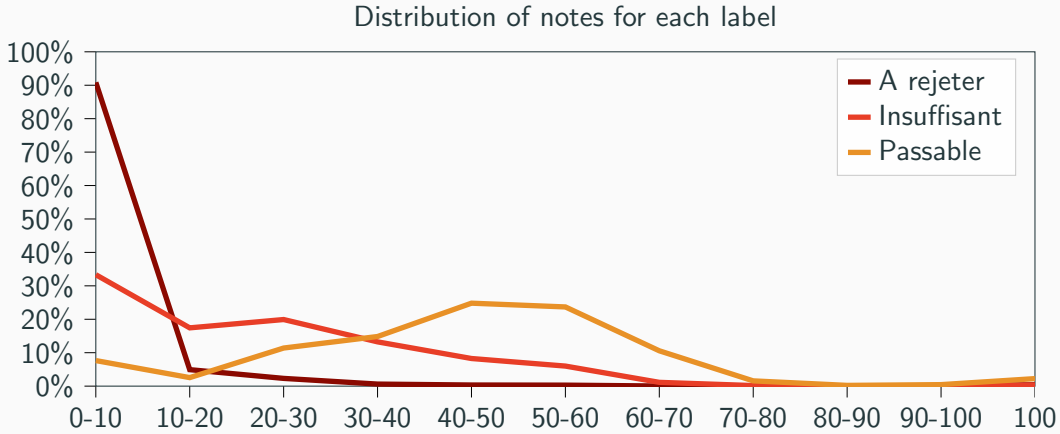
# Opinion and labels



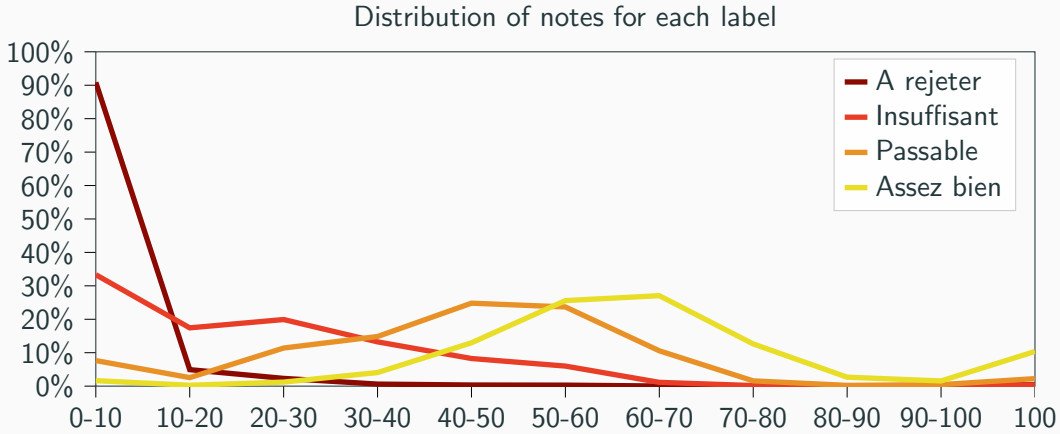
# Opinion and labels



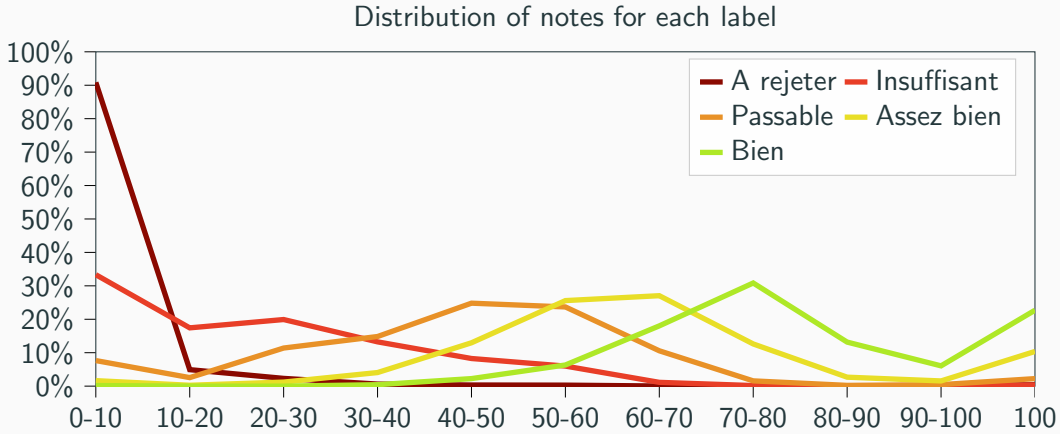
# Opinion and labels



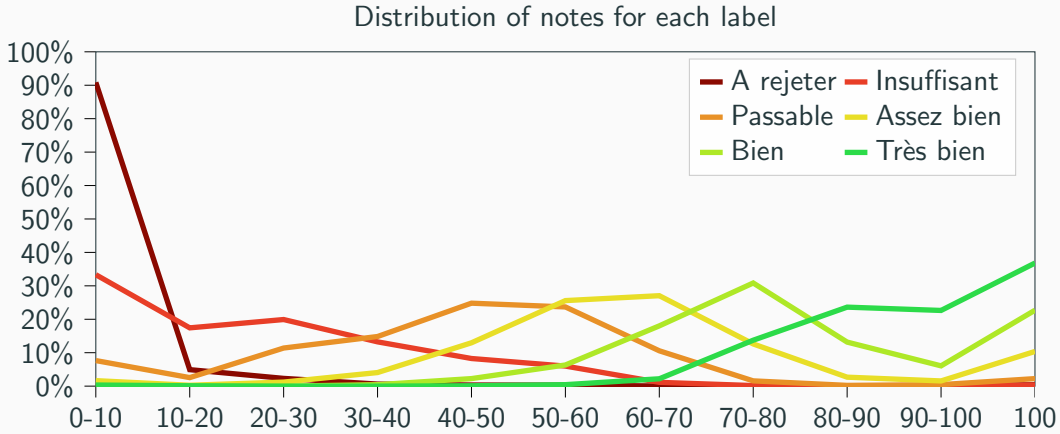
# Opinion and labels



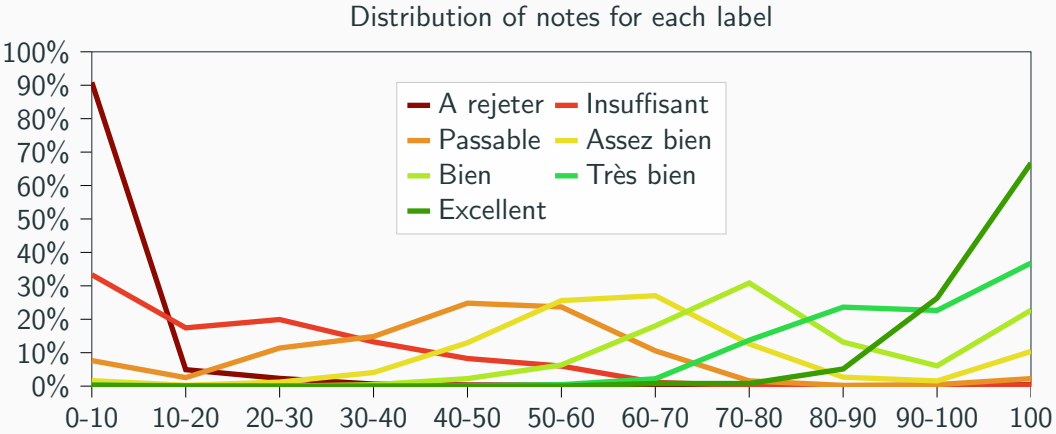
# Opinion and labels



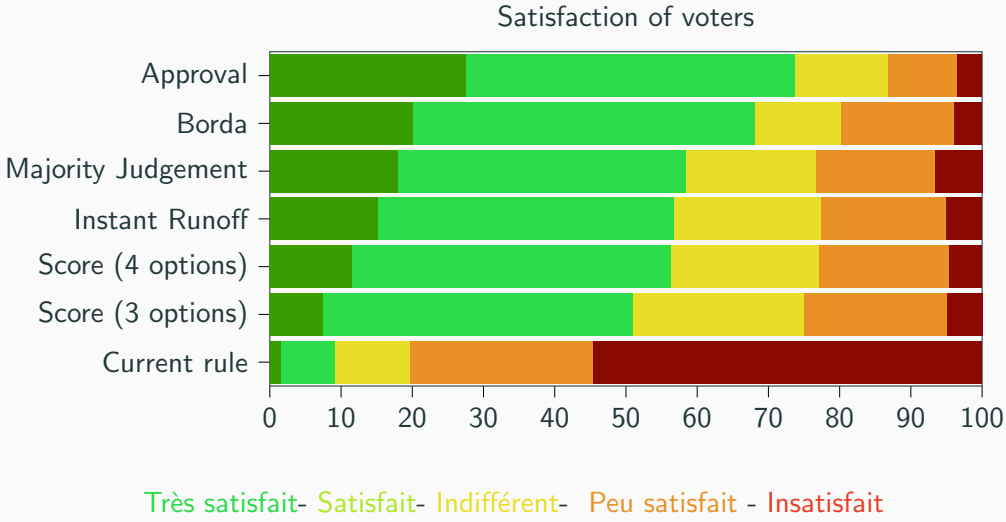
# Opinion and labels



# Opinion and labels

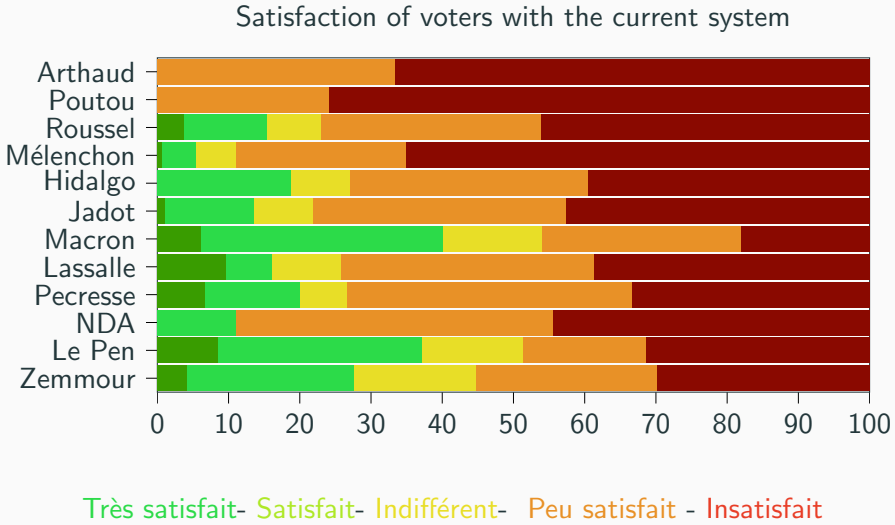


# 4. Opinions on voting methods


Satisfaction of voters
Approval
Borda
Majority Judgement
Instant Runoff
Score (4 options)
Score (3 options)
Current rule
0
10
20
30
40
50
60
70
80
90
100
Très satisfait- Satisfait- Indifférent- Peu satisfait - Insatisfait

In the polls done on representative sets of voters, **the dissatisfaction with the current system is not as clear**.

# Satisfaction depending on the vote at the election



# Thanks for your attention!

**Try it yourself:** `vote.imag.fr`

**More detailed analysis:** `vote.imag.fr/results/online-2022`

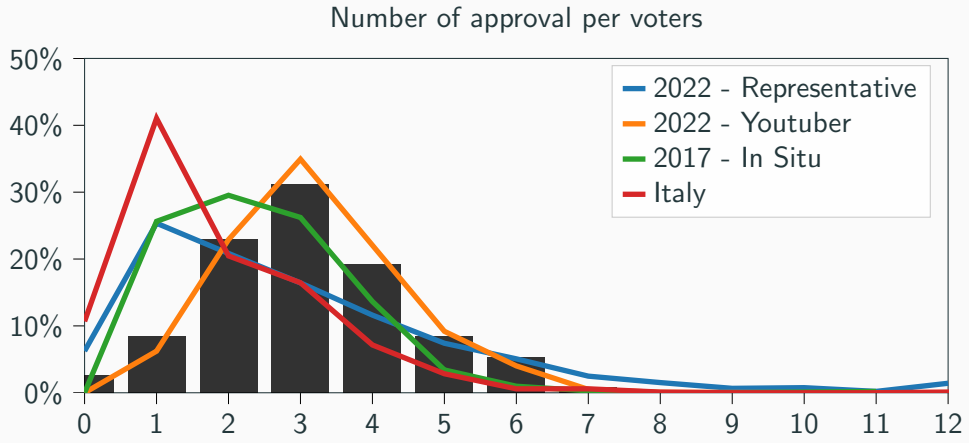
**About the project:** `www.gate.cnrs.fr/vote/`

**Questions?**

# Appendix

# 2.1. Approval voting

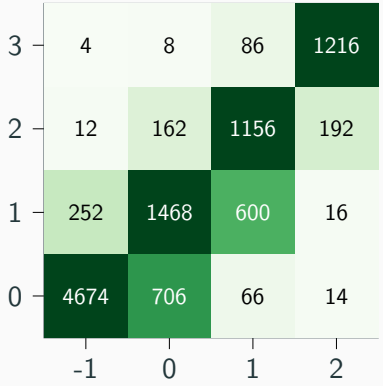
# Number of approvals



# 2.2. Score voting

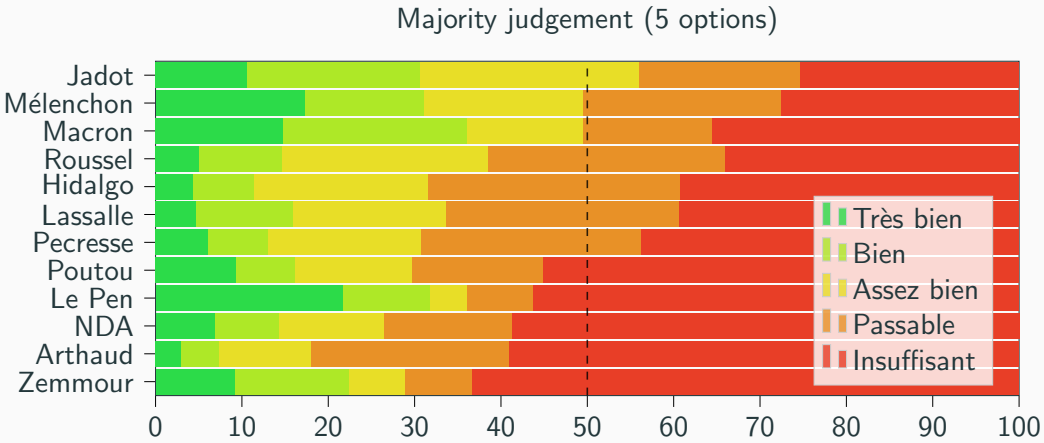
# Choice of scores

Correspondances of scores with different scales

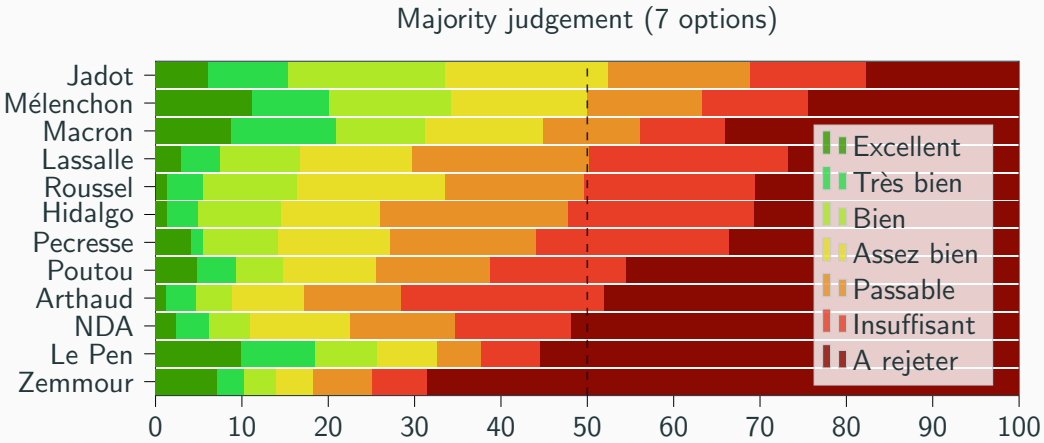


# 2.4. Majority Judgement

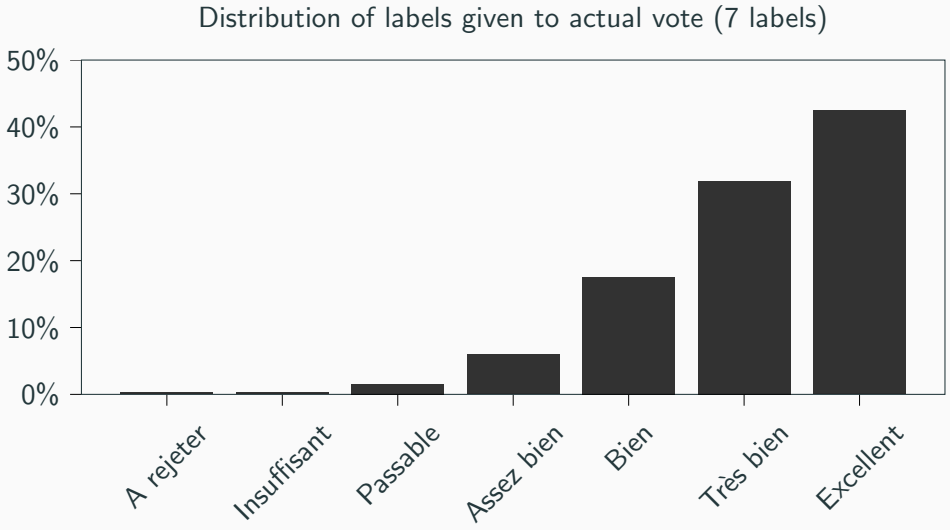
# Majority judgement: results



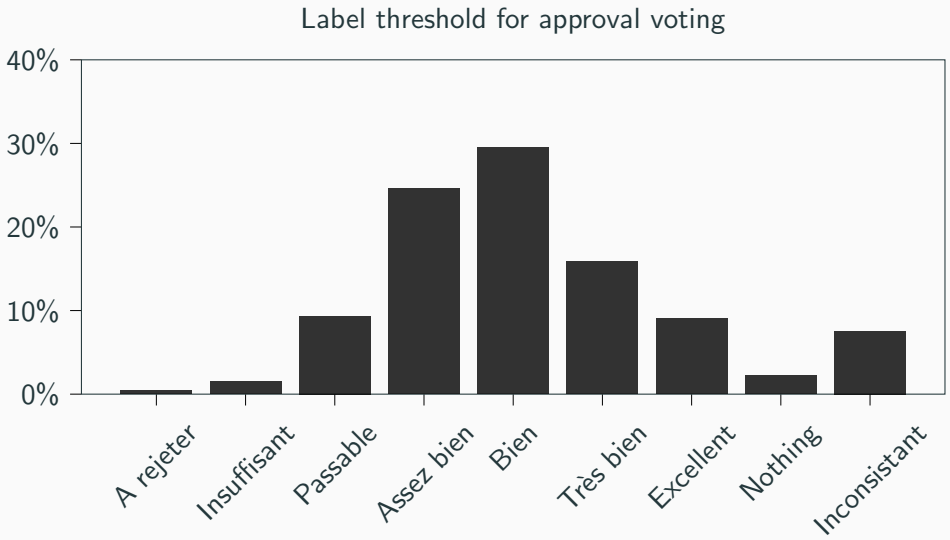
# Majority judgement: results



# Label of the official vote



# Approval and labels



# Scores and Labels

Correspondent score of the label "**Passable**" for different settings ($\sim$ 450 voters in each group):

| **Scores** | **MJ** | $n$ | $-1$ | $0$ | $+1$ |
|---|---|---|---|---|---|
| $(-1, 0, 1)$ | 5 labels | 935 | 36% | 61% | 3% |
| | 7 labels | 720 | 20% | 73% | 7% |
| $(-1, 0, 1, 2)$ | 5 labels | 1071 | 21% | 63% | 16% |
| | 7 labels | 623 | 11% | 68% | 21% |

# Scores and Labels

Correspondent score of the label "**Passable**" for different settings ($\sim$ 450 voters in each group):

| **Scores** | **MJ** | $n$ | $-1$ | $0$ | $+1$ |
|---|---|---|---|---|---|
| $(-1, 0, 1)$ | 5 labels | 935 | 36% | 61% | 3% |
| | 7 labels | 720 | 20% | 73% | 7% |
| $(-1, 0, 1, 2)$ | 5 labels | 1071 | 21% | 63% | 16% |
| | 7 labels | 623 | 11% | 68% | 21% |

# Scores and Labels

Correspondent score of the label "**Passable**" for different settings ($\sim$ 450 voters in each group):

| **Scores** | **MJ** | $n$ | $-1$ | $0$ | $+1$ |
|---|---|---|---|---|---|
| $(-1, 0, 1)$ | 5 labels | 935 | 36% | 61% | 3% |
| | 7 labels | 720 | 20% | 73% | 7% |
| $(-1, 0, 1, 2)$ | 5 labels | 1071 | 21% | 63% | 16% |
| | 7 labels | 623 | 11% | 68% | 21% |

# 2.5. Pairwise comparisons

## Comparison ballot

| | | | |
|---|---|---|---|
| Candidate 1 | ☑ | ☐ | Candidate 3 |
| Candidate 2 | ☑ | ☐ | Candidate 6 |
| Candidate 5 | ☐ | ☐ | Candidate 1 |
| Candidate 4 | ☐ | ☑ | Candidate 3 |

- Voters decide between some **pairs of candidates**.
- The pairs are **random** and different for every voter.
- Each pair has been shown to $\sim 200$ voters in total.
- **Note:** You could also obtain pairwise comparisons by asking for the full ranking.

## Candidate 1 VS Candidate 2

54% Candidate 1 ☑ ☐ Candidate 2
46% Candidate 1 ☐ ☑ Candidate 2

## Candidate 1 VS Candidate 2

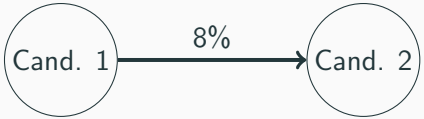
54% Candidate 1 ☑ ☐ Candidate 2
46% Candidate 1 ☐ ☑ Candidate 2

⇓

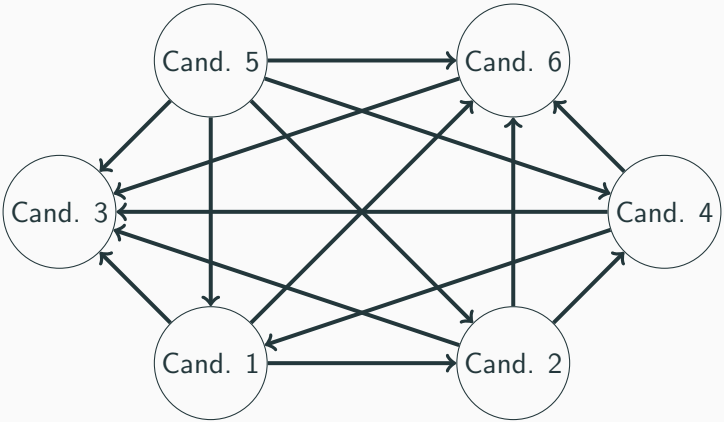
## Candidate 1 VS Candidate 2

54% Candidate 1 ☑ ☐ Candidate 2
46% Candidate 1 ☐ ☑ Candidate 2

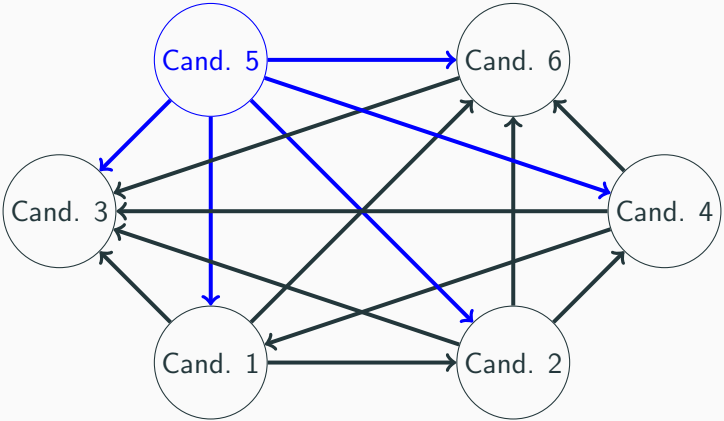
⇓



# The domination network

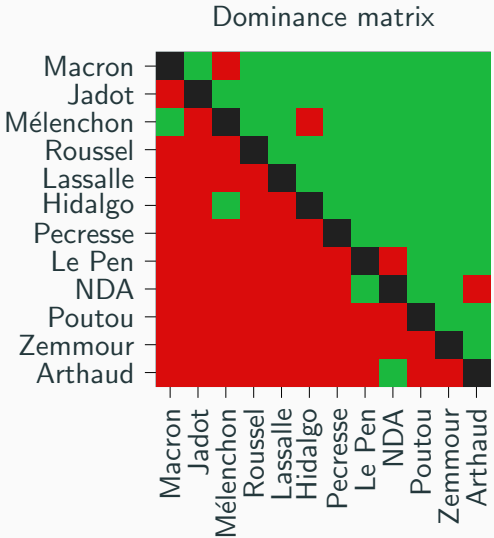


# The domination network



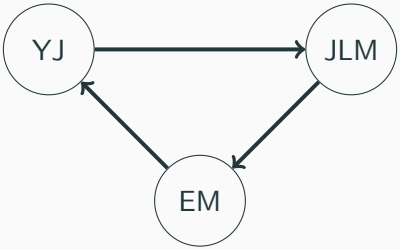

**Candidate 5** is a **Condorcet winner!**

# Results


Dominance matrix
Macron
Jadot
Mélenchon
Roussel
Lassalle
Hidalgo
Pecresse
Le Pen
NDA
Poutou
Zemmour
Arthaud

# Condorcet cycle

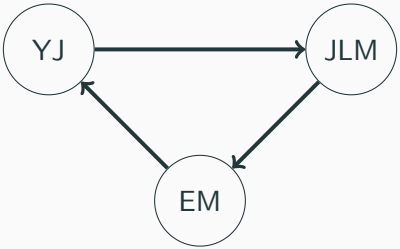
**No Condorcet winner**, but a **Condorcet cycle**:




How to choose in this situation?

# Condorcet cycle

**No Condorcet winner**, but a **Condorcet cycle**:




How to choose in this situation?

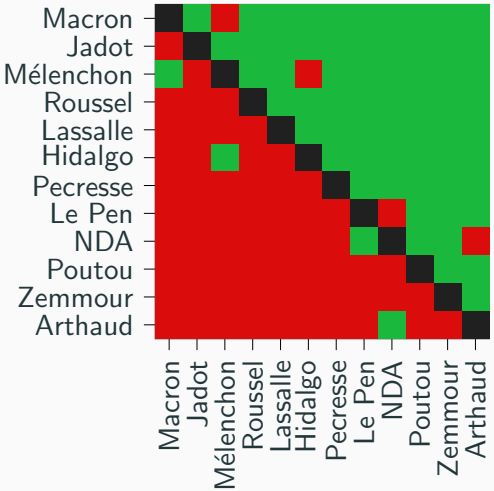
$\Downarrow$

Use a **Condorcet-consistent** voting rule (e.g. Copeland, Ranked Pairs, Minimax, etc.)

# Copeland

**Copeland:** the winner is the candidate that win the highest number of duels.

Dominance matrix

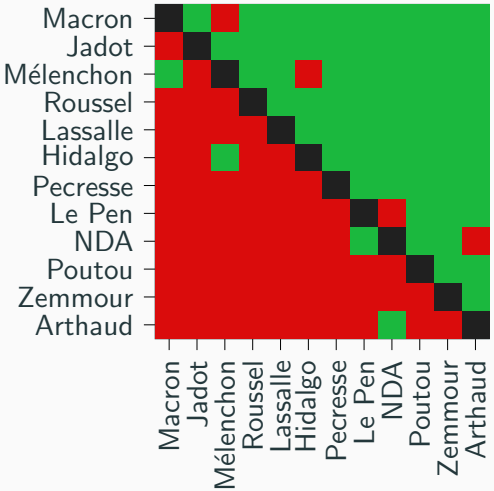



| | W | L |
|---|---|---|
| **Jadot** | 10 | 1 |
| **Macron** | 10 | 1 |
| **Mélenchon** | 9 | 2 |

# Copeland

**Copeland:** the winner is the candidate that win the highest number of duels.

Dominance matrix



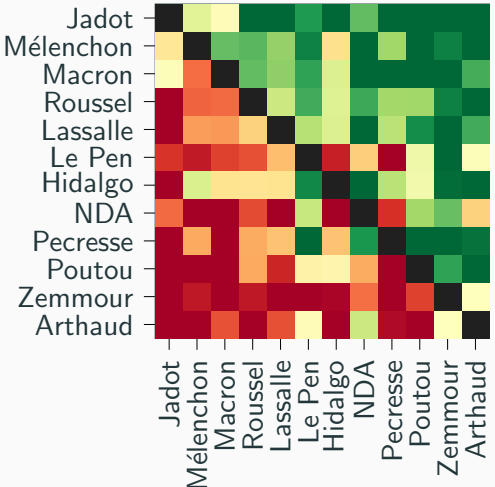

| | W | L |
|---|---|---|
| **Jadot** | 10 | 1 |
| **Macron** | 10 | 1 |
| **Mélenchon** | 9 | 2 |

There is **still a tie!**

# Minimax

**Minimax:** the winner is the one who have the highest worst score in a duel

Weighted dominance matrix

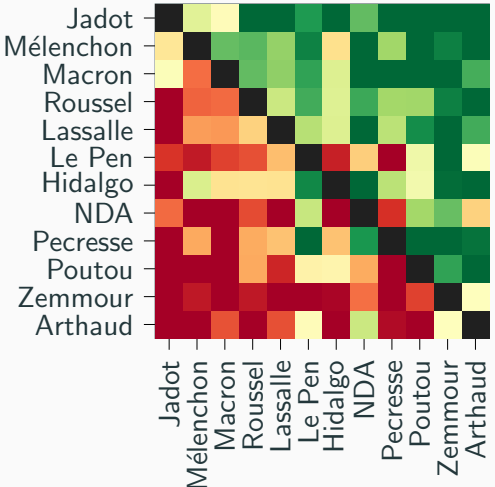



| | worst score | against... |
|---|---|---|
| **Jadot** | 49.7% | Macron |
| **Macron** | 46.8% | Mélenchon |
| **Mélenchon** | 40% | Hidalgo |

# Minimax

**Minimax:** the winner is the one who have the highest worst score in a duel

Weighted dominance matrix

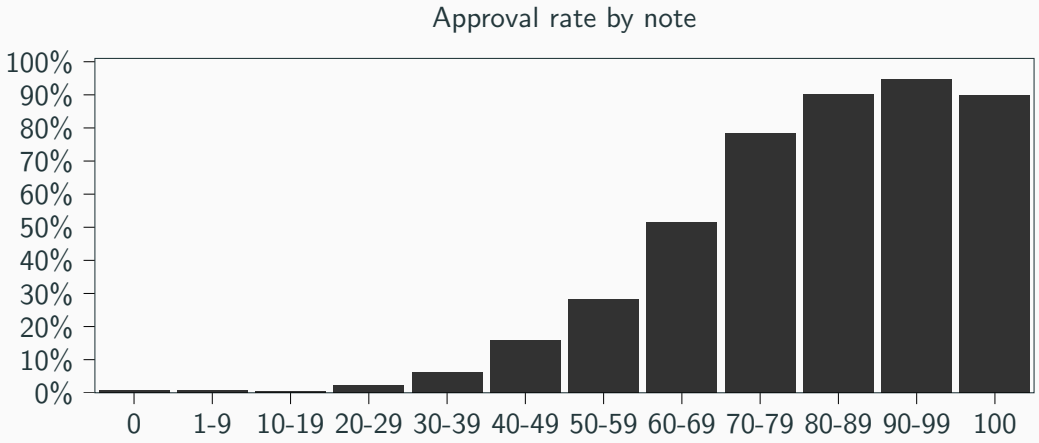



| | worst score | against... |
|---|---|---|
| **Jadot** | 49.7% | Macron |
| **Macron** | 46.8% | Mélenchon |
| **Mélenchon** | 40% | Hidalgo |

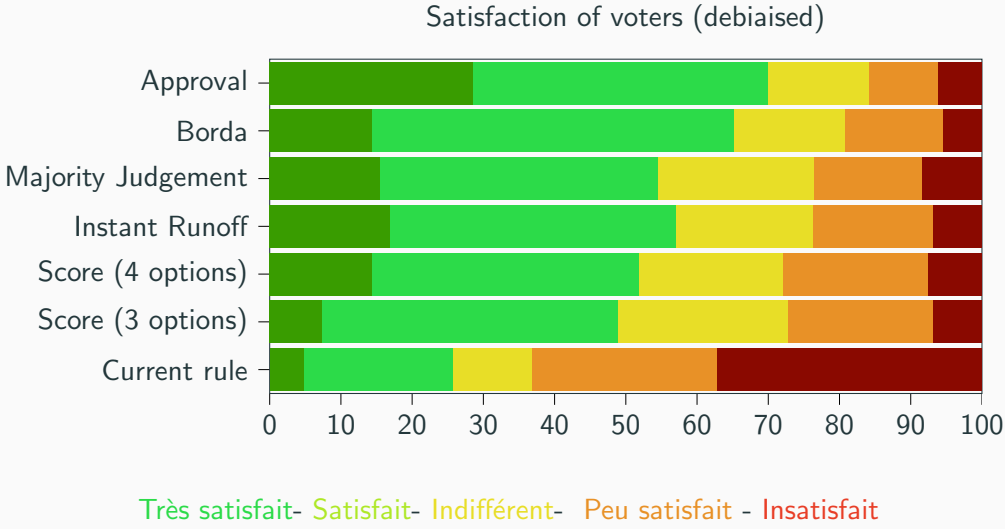
We have a **winner**!

# 3. Opinions on candidates

# Opinion and approval



# 4. Opinions on voting methods


Satisfaction of voters (debiaised)
Approval
Borda
Majority Judgement
Instant Runoff
Score (4 options)
Score (3 options)
Current rule
0
10
20
30
40
50
60
70
80
90
100
Très satisfait- Satisfait- Indifférent- Peu satisfait - Insatisfait