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# BORDA VS CONDORCET

by

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**Abstract**

This thesis investigates the application of Borda and Condorcet Methods within regimes for financial and macroeconomic decision making, to provide a comprehensive review of their theoretical foundations, mechanics and relevance. The methods for aggregation of diverse preferences in complex decision environments take advantage of social choice theory to provide structured frameworks. When building consensus and requiring balanced representation, the Borda Count is the rule of choice given its inclusiveness and broad preference capturing ability. By contrast, the Condorcet method places special emphasis on majority rule and robust decision making and is therefore best suited to scenarios where clear public or stakeholder support is critical — for example, national referenda and policy reforms. The strengths and weaknesses of each method are disclosed, with inclusion as a strength in the Borda Count and vulnerability to strategic voting, as well as majority support as a feature of the Condorcet method and the prevalence of the Condorcet Paradox. These results also highlight the role of context in choosing which method of decision making is best suited, with the Borda Count better suited in diverse and complex stakeholder environments and the Condorcet method best fitting those requiring strong majority backing. Study limitations include that the study rests on theoretical frameworks and that there is no empirical validation, limiting the generalization of findings. Further research is suggested to empirically test these methods empirically in real world deployments, examine how they may be integrated with other advanced technologies, and model reasonable hybrid methods that have characteristics of both. This study further confirms the significance of social choice theory for dealing with the complex questions of financial and macroeconomic decision making by advancing our understanding of preference aggregation.

**Keywords:** Borda Count, Condorcet Method, Social Choice Theory, Decision-Making Frameworks

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## Chapter 1: Introduction

### 1.1 Overview

Decision making in financial and macroeconomic settings is about achieving outcomes that, while benefiting one stakeholder, are detrimental to another, and vice versa, within complex environments which often consist of competing interests. To manage this complexity, people have developed and applied models that seek to structure preferences using by the Borda and Condorcet voting methods, for example, designed to allow decision makers to aggregate preferences in a fair and transparent fashion. The central research question studied here concerns the effectiveness and the limits of the Borda and the Condorcet method in aggregating preferences in the financial and macroeconomic settings. Although these methods are originally from social choice theory, they are especially useful when the stakeholders have different perspectives as they give us structured framework to consider a large variety of preferences, and can reach consensus (Herrero & Villar, 2021).

Given the complexity of financial and economic decision making, applying structured voting methods, such as Borda and Condorcet, to these decisions provides value in forcing an organization of a complex set of information and preferences, which will have a bearing on national policy, the setting of corporate policies and even market stability. Making financial decisions, either in the corporate boardroom or in a comprehensive way at the national level often means balancing conflicting objectives, such as maximising shareholder value, the promotion of sustainability and regulatory compliance (Ahmadi & Herdiawan, 2021). Thus, the tools necessary for managing complex decisions in macroeconomic decision making (e.g. fiscal policy, the national debt, trade agreements; Liao et al., 2020) are also needed. This study analyzes the strengths, weaknesses, and contexts in which each voting method is best, to provide insights that might be used in efforts to maximize the efficacy of complex decision making in these fields.

Jean-Charles de Borda (18th century) had developed methods, the Borda and Condorcet voting methods, which are still in wide use for making collective decisions. Borda Count allocates points based on ranking, so each voter ranks all options, the highest ranked gaining the most points, with each subsequent ranking receiving fewer points (Duddy et al. 2016). This point-based system is in place to enable decisions with a broad consensus as

this way of making decisions considers which choices are preferred most not just the first choice (Kilgour et al., 2022).

The Condorcet method, on the other hand, tests each of the options in head against head against the others and chooses the one it prefers in each round of testing. The majority backed choice is declared as such: the option that wins all such comparisons (Pattanaik, 2002) and is thus well suited to a world with strong need for majority support. A known challenge, though, is the problem of the Condorcet Paradox, i.e the case where cyclical preferences prevent a single option from winning all comparisons (Gehrlein & Valognes, 2001).

Today's approaches to these methods address new decision-making challenges. Engagements of fuzzy logic extensions are provided to the Borda Count for example in order to make it more robust against ambiguous preferences as argued by Zarghami (2011). For similar reasons, iterative versions of the Condorcet method also realize majority preference stability in the presence of preference evolution (Neveling & Rothe, 2021). Both methods are relevant for financial and macroeconomic decision making, and the former assures these advancements.

The Borda Count can be thought of as a balanced way of aggregating a whole range of preferences, in the sense that, in the simple context of corporate finance, boards of directors don't know which projects or investments to pick but are instead given a ranking of them. For example, it enables directors to compare and evaluate different options on both risk, return and strategic fit grounds, in a manner which reflects a wide consensus in outcomes (Bradley & Wagner, 2012). Individual preferences are aggregated in this process, increasing trust among stakeholders and increasing transparency (Emerson, 2024). Nonetheless, the Borda Count retains vulnerability to tactical voting and can, especially in decisions with high stakes, be influenced by influential stakeholders (Kilgour et. al, 2022).

As applied to regulatory reform or national referenda, the Condorcet method's majority rule structure is helpful for economic policy decisions, when strong public support is essential (Gehrlein & Valognes, 2001). Condorcet can be used by financial regulators to test policies against each other for broad based acceptance. Like other methods, this one concentrates on those issues regarding which there is a majority in favour; this is consistent

with democratic values, as majority support is clearly more legitimate than minority support in reaching policy decisions (Nurmi, 2002). Borda was collectively inclusive; however, Condorcet Paradox accentuates the utilization of hybrid model that comprise Condorcet's bones of majority preference and Borda's instinct of inclusivity (Barnett, 2021).

These voting methods are also important for political referenda, which express public preferences on social issues of broad scope. In the 2014 Scottish Independence Referendum, Scottish citizens voted to determine their country's independence from the United Kingdom. This referendum was carried out using a simple majority vote; however, preference-based method con Borda and Condorcet would offer a better insight to public sentiment (Grandi et al., 2016). An example would be to say that the referendum should have included several available options such as full independence, autonomy within UK and to choose the status quo; preference aggregation would then show the range of public opinion in a structured way.

This method calls for voters to rank each option according to their preference level, letting the Borda Count yield an outcome that captures the consent of the larger public above just a yes or no answer (Pattanaik, 2002). In contrast, the Condorcet method would choose to have majority support in pairwise comparisons and the outcome will match the preference which would have defeated another alternative (Gehrlein et al., 2016). In future referenda on complex questions, policymakers could use Borda and Condorcet to gauge public preferences to make decisions that better reflect the preferences of many different parts of society.

The Borda and Condorcet methods promise to improve the legitimacy of and acceptance to referendum outcomes by providing structured and transparent methods of aggregation of preferences. These methods can avoid polarization in a politically sensitive place such as a regional independence vote by giving results that do not represent a simple majority, but broad consensus. Moreover, the combined use of these methods will also guarantee that outcomes are both representative and majorityasive to prevent narrow win, divisive votes (Saputri, 2024).

## 1.2 Background

Among all social choice theory voting mechanisms, Borda Count and Condorcet are basic and frame how to aggregate group preferences. In late 18th century, these methods were developed by Jean Charles de Borda, and the Marquis de Condorcet, in order to overcome the short comings of simple majority voting. Each method approaches preference aggregation differently: The Borda Count is a ranking and point allocation, whereas the Condorcet method works on pairwise comparison. Since then, these methods have been used in many domains, ranging from politics, to corporate governance, and to decisions in finance and economics.

### *The Borda Count*

The Borda Count was suggested in 1770 by Jean-Charles de Borda as an alternative to majority voting, fairer because instead of offering a single perspective on the group's preference, with the risk of defeats for parities that, collectively, could form a majority, it provides a comprehensive picture of group preferences when multiple options are in play (Duddy et al., 2016). The Borda Count awards more points for ranking choices higher than lower ones and gives more points to the first place choice than those with lower ranking. Finally, the option with the highest score is the winner (Kilgour et al., 2022).

Ranking based approach of the Borda count is favorable in cases when broad consensus is needed. It subtracts polarization, so they can make decisions based on the interests of the whole crowd (Ahmadi & Herdiawan, 2021). For example, this inclusive approach has made the Borda Count popular in corporate governance and financial decisions; boards can rank investment options on their predicted returns, risks, respectively, the degree of alignment with strategic objectives (Ashaf et al., 2019). However, the method is susceptible to 'tactical voting' — when participants rank options with the intention of influencing the result. However, such vulnerability may affect results in high stakes decisions (Kilgour et al., 2022). However, risk management, environmental planning and other fields have come to adopt modern adaptations of the method by incorporating fuzzy logic that can provide more robust decision, in addressing preference ambiguity or uncertainty (Zarghami, 2011).

### *The Condorcet Method*

Condorcet introduced the Condorcet method to favor majority preference by direct comparisons. The contest between alternatives is each against all other alternatives and the winner of the contest is an alternative that wins each pairwise contest against all other alternatives (Pattanaik, 2002). We say that this approach adheres well to democratic values since it imposes the option chosen to be most preferred for all other alternatives by the greatest number (Gehrlein & Valognes, 2001).

In situations where we need clarity, and a majority backed decision the value of the Condorcet method is huge. However, it can face the "Condorcet Paradox", which consists in the preferences of voters being cyclic over choices and in consequence no one of these is the voter preferred (Nurmi, 2002). The problem can then be adapted to (for example) iterative Condorcet comparisons and help decision makers reconsider decisions in changing regulatory or policy landscapes (Neveling & Rothe, 2021). Condorcet can be leveraged in finance to select from options requiring broad stakeholder support and improve stability when brought into implementation (Liao et al., 2020).

The Borda Count and Condorcet method make for attractive alternatives to majority voting because they structure the vote; they are each superior in differing situations. Condorcet's focus on outcomes backed by a majority has similarities with public policy and economic referenda but the Borda count is suitable for balancing preference representation similar to its application in corporate governance (Herrero & Villar, 2021).

Social choice theory is concerned with collective decision rules, theories of aggregation of diverse preferences to a single outcome. In financial, corporate and macroeconomic contexts, decisions should satisfy various stakeholders' preferences, including profitability, risk, or compliance, it is particularly relevant (Nurmi, 2002). The Borda and Condorcet methods, both based in the realm of social choice theory, provide two unique such mechanisms for aggregating arbitrary preferences to facilitate cross domain decision making.

Moreover, the Borda Count is an inclusive method that satisfies the principles of social choice: the method totals preferences by scoring options based on their rank. It's especially

effective in contexts where there are many opinions, by guaranteeing each have its expression proportional to its relative popularity. This inclusivity in financial decision-making is beneficial for matching different priorities of stakeholders, e.g. board members or shareholders, who may have different priorities, e.g. metric such as risk mitigation, profit maximization, etc. (Kilgour et al., 2022). For instance, the Borda Count can be utilised to rank investment options in corporate governance and identify the most suitable investment option based on various criteria that matter across departments such that the final decision balances diverse perspectives amongst various departments (Bradley & Wagner, 2012; Ahmadi & Herdiawan, 2021).

On the other hand, the Condorcet method chooses the option which would win over other options in a pairwise contest. This system is especially useful where the consensus is or ought to be very strong and does so in a way that conforms to democratic principles. In the context of corporate and policy making, Condorcet's emphasis on majority preference mitigates the chance of divisive decision results, arguing that the decisions are taken in favour of those that enjoy widespread backing (possibly, for example, for some kinds of corporate restructuring or national policy that must have strong public support (Gehrlein et al., 2016)). To illustrate, the Condorcet method guides to pick the plan that would lead to approval in a run-down comparisons of restructuring plans to ease complex decision making (Herrero & Villar, 2021; Saputri, 2024).

In finance, both methods are helpful in balancing two sets of competing objectives, when shareholder or board priorities deviate. For example, the Borda count is characterized by stakeholders ranking of options like investment strategies or project funding allocations through stakeholders' preferences which are captured from various groups in a manner that will be useful in the case of corporate board decisions where departments involved have different goals (Ashaf et al., 2019). Borda allows multiple points of view to weigh into the final outcome preventing outcomes generated by single special interest groups and promotes cooperative decision making since it better represents generalized consensus (Duddy et al., 2016). The choice between risky but high return and conservative investments lend themselves quite readily to this approach, especially in high stakes environments.

When it comes to financial matters, prioritizing majority rule (Condorcet method) is good, since well–established choices are needed. For instance, if a policy or project pertains to more than one department or is intended to affect a company on a long run, the Condorcet method considers this option with the least internal conflicts (Pattanaik, 2002). Nevertheless, in situations where a clear and consistent decision is needed, the Condorcet Paradox, which means that a single option does not strictly win a non-cyclic pairwise comparison, constitutes a barrier. To mitigate this, Condorcet methods that require iterative processing have been developed; thus allowing decision makers to relook on their choices when stakeholder preferences change, offering stable resilience in the changing corporate environment (Pérez Fernández & De Baets, 2019).

The Borda and Condorcet methods are used in macroeconomic policymaking to take decisions of enormous public impact, including national referenda, or economic reforms. However, the Borda Count scores let us rank, for each priority, how important that priority is across different social groups, in cases where policymakers must consider more than one priority (e.g. economic growth, unemployment reduction, inflation control). Based on this ranking, a policy can be determined that balances the concerns of different constituencies and gains their confidence in such a policy (Liao et al., 2020). When multiple options are involved in national referenda, the Borda Count, by its method, prevents polarization by guaranteeing each option the proportionate representation (Emerson, 2024).

The Condorcet method has usefulness in binary decisions in a national context, i.e. yes/no referenda or policy votes where majority support often mattered. So say on an economic austerity referendum the Condorcet method would make sure that the solution adopted has majority support for every voter comparison and that the selection will be a stable outcome of the decision, matching with the population's overall preference (Powers & Wells, 2023). Condorcets majority rule nature is robust but require adaptations to prevent the Paradox, especially in polarized environments where cyclical preference can retrieve a definitive result (Nurmi, 2002).

We extend the Borda and Condorcet methods, developed in the early days of social choice theory, for which significant strides have been made, to address the modern complexities of decision making. For example, fuzzy logic extensions of the Borda Count have been

developed that are able to handle the fuzziness of preference, i.e., where there is no clear-cut answer, as happens when making financial risk assessments or when judging the economic environment (Zarghami, 2011). Adaptations are made in place to allow for incorporating ambiguous or conditional preferences into a final decision, expanding the use of the Borda Count in areas where uncertainty is low (Rothe, 2019).

Also, the Condorcet method has, in turn, advanced to emphasize iterative decision making, a scenario that is useful in a dynamic regulatory environment where decisions are reviewed cyclically. Iterative Condorcet models incorporate priorities that could change with time, allowing these models to be stable over changing markets, guaranteeing that policies remain majority supported while economic conditions are variable (Neveling & Rothe, 2021). These adaptations exhibit the flexibility of social choice theory to engage complex, modern financial and macroeconomic decision making (Wang et al., 2024).

Macroeconomic events such as political and economic referenda are important because they reflect the public's mood regarding important changes in policy with wide ranging economic ramifications. Voting methods such as Borda and Condorcet could have some value in these referenda by avoiding dichotomous questions where the public choice is between two options and filling in a more nuanced picture of public preference between more than two policy choices. One prominent example is the 2015 Greek referendum in which collective decision-making influenced shaping of national economic policy and stability, a foreign relation aspect which brought, and still brings, about consequences.

Greece voted in a referendum in July 2015 to accept or reject terms in a bank bailout agreed to with the European Union, International Monetary Fund and European Central Bank. This amounted to substantial austerity measures, including pension cuts, higher taxes, and other reforms to stop Greece's debt crisis. In the referendum, Greek citizens had a binary choice to make between 'Yes' or accepting the bailout terms or 'No,' rejecting them, and a majority (*) voted 'No.' However, the economic consequences of this decision for Greece to continue negotiating with its creditors (Sutoyo et al., 2023) were weighed against a very firm rejection by the public of further austerity.

Binary voting is illustrated in the Greek referendum by limiting voters to two options failing to take into account other possibilities, or combinations of opportunities, that could

have garnered wider support. Borda and Condorcet methods could have offered a broader view on public sentiment than yes/no vote, for example by letting citizens try more options: other austerity plans, restructuring options that differ with their economic and social impact (Barnett, 2021). For example, Greek citizens could have configured a Borda Count by varying degrees of support for several policy alternatives, leading to a more representative view of public preferences that would guide negotiations.

Likewise, the Condorcet method, which selects the option most preferred by a majority in pairwise comparisons, would have shown that the policy with the greatest acceptance is chosen. A Condorcet approach to macroeconomic referenda, in which policy decisions have great, lasting impact, ensures that the selected option would prevail in a head-to-head competition against any other possible choice, thus avoiding, in principle, excessively polarized outcomes that lack sufficient public support (Pattanaik, 2002).

The Greek referendum exemplifies the necessity of macroeconomic preference aggregation in contexts in which there are multiple and multidimensional issues at stake. In such contexts, applying preference-based voting methods can increase the transparency in decision making, providing better comprehension of public preferences to policy makers, in addition, fostering stability by making a decision that better corresponds with the popularity of the will of the public (Ahmadi & Herdiawan, 2021).

### 1.3 Research Aim

The aim of this thesis is to contrast two voting methods, Borda and Condorcet, and evaluate their appropriateness in the financial and macroeconomic decision-making arena. The method is based on social choice theory and provides a structured way to aggregate people's preferences against each other while overcoming the problems with simple majority voting that such aggregation methods tend to have. The Borda Count is a ranking based point system where the strongest point is given for first place, the second strongest point is given for second place etc., while the Condorcet methods attempt to find the option that is preferred by the majority via the pairwise comparison. The strengths and limitations of each method, as well as each method’s suitability for complex decision-making environments like corporate governance, investment prioritization and public policy, are analyzed in this study (Herrero & Villar, 2021).

Given many stakeholders with varying – even conflicting – priorities, such as in finance or macroeconomics, we need techniques to achieve either balanced or majority supported outcomes for effective decision making. Through the comparison of Borda and Condorcet, we find the best fit between these multifaceted settings and a selection mechanism. Performance of each method in such situations as investment selection or economic referenda will be studied and the ability to facilitate widely accepted decisions using a particular method will be compared.

The Borda Count, which guarantees inclusivity, aggregates preferences through a ranking, and can be utilized well for corporate boards, financial committees, or any entity facing the challenge to balance multiple considerations like, for example, risk and return (Ahmadi & Herdiawan, 2021). But like all social choice methods, the Borda Count is subject to strategic voting: that is, voters can manipulate the ranking to sway the outcome (Kilgour et al., 2022).

On the other hand, the method of Condorcet places majority rule up front through pairwise comparisons and is appropriate for decision making when we want to decide for or against something by a clear majority (e.g. national referenda on economic policies). The winning option in this scheme is guaranteed to have widely dispersed direct support, despite the Condorcet Paradox whereby preferences cycle when a Condorcet winner does not exist (Dietrich, 2014). These nuances are examined in this study with a view to giving some precision as to in which contexts each method is best suited for financial and macroeconomic decision making (Nurmi 2002).

The research also aims to describe locales where each method perform optimally, so as to give guidelines to finance and public policy decision makers. The Borda Count is expected to outshine in cases in which diversity of preference is important, for instance when deciding on corporate board, while the Condorcet method could be more convenient for macroeconomic referenda requiring a strong majority consensus (Liao et al., 2020). Based on this study, preference aggregation in multi stakeholder environments will be better understood in social choice theory, which helps boards and policymakers to choose a method that promotes transparency and consensus (Saputri, 2024).

This study focuses on three main objectives: First, we aim to understand how the mechanics and differences in the Borda and Condorcet methods, apply the insights to real life finance (more specifically the world of mutual funds) and macroeconomics.

***Objective 1: Comparison on mechanics and differences between Borda and Condorcet Method.***

The Borda Count suggested by Jean-Charles de Borda works with a ranking based system: voters give points depending on their preferences. In this system broader ranges of preferences are captured, supporting choices that receive more support, if not, majority support, as each rank has a positive influence in the ultimate effects (Duddy et al., 2016). The Condorcet method, viz. (named after Marquis de Condorcet), takes up the pairwise comparisons between the candidates and it is the candidate that outperforms in majority in every match up so chosen which has a broad support. However, in cases of people's preferences being cyclic without having a clear winner, as in the Condorcet Paradox (Wu et al., 2018), the results can be complicated.

***Objective 2: Method Strengths Vs. Weaknesses Evaluation***

In various scenarios that require consensus from a large group, inclusivity of the result, namely, the ability to encompass many possible preferences is attractive, such as in the Borda Count (Ahmadi & Herdiawan, 2021). Though it faces the weakness of strategic voting — when participants can change their rankings to affect results — it is otherwise hard to game. For this reason, Borda is unsuitable for majority rule (Przybyla Kasperek, 2015).

On the other hand, the principle of majority preference, underlying the Condorcet method, is appropriate as regards making decisions that require full backing, e.g., national policy or economic reform (Gehrlein & Valognes, 2001). However, the method is susceptible for the Condorcet Paradox (Nurmi, 2002).

***Objective 3: Consequently, we apply our model to Real World Scenarios in Finance and Macroeconomics.***

Finally, the methods will be applied to actual world problems, e.g., corporate governance, allocation of investment, and macro point policy referenda. Contexts such as budget allocation, where there are multiple stakeholder priorities to balance, prove when the Borda Count's ranking system is helpful (Liao et al., 2020). In contrast, Condorcet's rationale that democratic decisions should be made by majority focus better deals with high stakes, where conclusive majority support is required, including shareholder votes or a referendum on economic policies (Powers & Wells, 2023).

## 1.4 Structure of the Study

The structure of this study establishes a methodical process to study the Borda and Condorcet decision-making approaches in financial and macroeconomic decision settings. The study begins with Chapter 1: The introduction gives a detailed depiction of research background together with statement of the study's objectives and analysis of the investigation context. The starting point of this chapter explains why structured voting methods serve as essential methods to combine various preferences into a single collective decision. The Theory and International Setting of Voting Systems receives detailed exploration in Chapter 2 through an extensive review that analyzes both the Borda and Condorcet systems. This section presents a mathematical review of voting methods through their comparison of capabilities alongside assessments of their practical deployment in finance and macroeconomics. In Chapter 3: Group Agency and Collective Decision-Making in Social Theory, the study situates the Borda and Condorcet methods within broader social theories. The chapter studies both group agency principles and collective intention theory together with how systems with functional diversity make collective choices through a theoretical examination of the methods. The author presents main study conclusions in Chapter 4 through a synthesis of findings combined with limitations and suggestions for future research. In addition to discussing research limitations the author provides directions which can lead to better applicability and understanding of voting methods in various decision-making situations for future investigations. The ordered structure shows how to move systematically from key theoretical elements toward

analytical investigation and synthetic critical evaluation which creates a complete understanding of the material.

## Chapter 2: Literature Review

### 2.1 Theoretical Foundations of Voting Systems

#### *Instrumental Rationality*

Instrumental rationality is the idea that each individual makes choices that are meant to maximize his or her objectives for the information available, and anticipated outcomes. If people work in an efficient way, by choosing (limited by their abilities and goals) means to produce (following their goals), then they act rationally (Pattanaik, 2002). This concept is highly influential in finance, in corporate governance and in macroeconomics, where choosing is expensive and calls for rational ways of aggregating preferences.

Within finance, investment strategies, portfolio management and risk are assessed from the point of view of instrumental rationality. In general, investors adjust to limit returns within the boundaries of their risk acceptance and take rational decisions based on portfolio theory, i.e., how to strike a balance between risk and return (Paiva et al., 2019). This method exists to aid voting in financial committees such as voting done through Borda and Condorcet systems from which rational individual preferences are aggregated to the collective choose to invest (Herrero & Villar, 2021). Although investors are not always strictly rational, as shown in behavioral finance, biases such as overconfidence can lead investors astray; therefore, structured voting is necessary to enable rational group behavior results.

In corporate governance, instrumental rationality drives board members, executives and shareholders toward the instrumental pursuit of activities that promote organizational goals. Directors use instrumental rationality, for instance, for decisions concerning mergers, acquisitions or budget allocations, when supporting options which, in their view, will optimize performance for the corporation (Ashaf et al., 2019). Borda and Condorcet voting systems align the individual rational preferences into decisions of strategic goals of the company. Balance of directors' priorities is ensured by the Borda Count and Condorcet's majority rule, providing strong support to the majority final choice of rational governance (Gehrlein & Valognes, 2001).

In macro topic, instrumental rationality is very important for policy in which government and central bank would like to achieve national objective such as economic growth and

inflation management. Rational decision frameworks are used by policymakers to choose policies with the best predicted outcomes, with respect to tradeoffs in pursuit of national interests (Liao et al, 2020). In public policy, voting systems like Condorcet, guaranteeing a majority backed result, are very valuable, as they reflect the rational majority preference; stability and support for economic reforms can then be fostered (Nurmi, 2002). Conversely, the Borda Count can support the complex policy decisions with modulated impacts by taking into account a broader scope of preferences (Zarghami, 2011).

***Collective Rationality***

This is a concept, under social choice theory, known as collective rationality, which means people's group decisions are consistent with the group's goals and preference. While individual rationality is an aggregative property involving personal interests, collective rationality is a property of group decisions minimizing the sum of individual squared deviations from an objective that balances and integrates the preferences of all participants. Central to making good decisions in organizational, financial, and national economic contexts with high stakes and complex stakeholder interactions for which coherent and representative choices must be made, is this concept.

Collective rationality serves an important role in organizational decisions that involve a variety of stakeholders, cases like corporate strategy, resource allocation and corporate governance. Collective rationality can be operationalized by aggregating individual preferences, voting systems that can accomplish this task in an organization include something called the Borda Count or the Condorcet method (Bradley & Wagner, 2012). For example, in a corporate board situation, directors might range from focusing on short term profit to sustaining benefits in the long run. Voting methods which take these preferences into consideration lead to a balanced result that considers different views, but within the company's general direction (Ahmadi & Herdiawan, 2021). By encouraging collective rationality such systems promote consensus, decrease conflict, and increase strategic coherence.

Another important quality of finance is collective rationality, represented by investment committees, regulatory and shareholder assemblies, where decisions made by one individual affect others. In these settings decisions such as this are made between risk and

returns, and sometimes also strategic interests. For instance, collective rationality can be brought about by voting methods such as Borda or Condorcet, in which case investment boards can use them to rank investment opportunities according to the balancing of preferences of all their members (Kilgour et al., 2022). Furthermore, shareholder decisions regarding acquisitions or restructuring are based on the principle majority, whereby Condorcet assures the final decision can embrace a broad selection of majority-backed proposals, and therefore helps mitigate dissent and increase buy in (Weishaupt 2022).

Collective rationality in national economic decision making is particularly important when policies concerning the whole population can be made, that is policies of fiscal type or economic reforms. Methods like Condorcet are useful, for instance in referenda on economic matters, to provide the winning choice with legitimacy and stability in the sense that such a choice offers the most favourable outcome to a majority in pairwise comparisons (Nurmi, 2002). Just like the Borda Count can be used to capture a full picture of what the public prefers, in multi-issue referenda where voters may have nuanced views of multiple policy options. The broad base aggregation of decisions that enhance collective will removes opposition applying to public trust (Liao et al., 2020).

***Collective Preferences***

Collective preferences are the mechanism of converting individual preferences into a group decision, motivated in social choice theory and several decision-making frameworks. From the point of view of voting, central roles are taken by the Borda and Condorcet, that is, systems for translating many individual choices into one result within the group as a whole. This is a critical process for aggregation in organizational, financial and national contexts, where the making of cohesive decisions depends on the effective representation of diverse interests.

The Borda Count method consolidates individual rankings, simple assigning points according to preference order with higher ranked choices receiving more points. This method records a fan spectrum instead of fixing on just the top preference. For example, within a corporate board you could imagine members ranking investment alternatives along the dimensions of risk, return, and strategic fit. In this, the Borda Count aggregates these rankings in order to determine the option with the highest total points and this most

generally will be a balanced consensus that takes into account of all participant's preferences (Duddy et al., 2016).

In cases where tastes are blurred, this point-based system is especially useful because it does not engender polarization seen in several single winner voting types through its consideration of the whole spectrum of positions. While a Borda Count offers outcome that accords with collective priorities, it is therefore ideal for scenarios that demand consensus between stakeholders with different interests like corporate governance and committee decision (Kilgour et al., 2022).

On the other hand, the majority is inferred by pairwise comparisons, using the Condorcet method. Head to head, against each other, the Condorcet winner is the option that would beat every other option in these one to one choices. This approach is based mainly on majority rule, using a system where the last choice is a choice most voters prefer to that of alternatives (Pattanaik, 2002).

Condorcet helps establish a clear, democratic outcome to national economic decisions and high stakes corporate resolutions in accordance with public opinion or majority shareholder interests. The problem is that it may run into the 'Condorcet Paradox' when there are cyclical preferences among the voters, and so nobody is the winner. Nevertheless, adaptations such as iterative Condorcet comparisons can accommodate revisiting of decisions which is important in a changing policy environment (Sato, 2017).

Both the Borda and Condorcet methods offer distinct advantages based on the decision context. Borda excels in capturing a range of stakeholder preferences, fostering inclusive outcomes in corporate and financial decisions where collective satisfaction is essential (Ahmadi & Herdiawan, 2021). Conversely, Condorcet's ability to represent majority preference is especially valuable in public referenda or policy decisions, ensuring robust support for the selected option (Gehrlein et al., 2016).

### 2.2 Borda and Condorcet: Historical and Theoretical Context

The Borda and Condorcet methods play central roles in the toolkit of preference aggregation in social choice theory: they represent two structured ways of making a collective choice. The methods that evolved in the 18th century, caused to be the

brainchildren of Jean-Charles de Borda and Marquis de Condorcet, respectively, provide different ways to decide on the group preferences. Bordas sistema de aplicación es el punto de rango, Condorcets utiliza las comparaciones binarias, y ambos suponen la transgresiòn de la votaciòn de mayoría simple al producir resultados justos y que representan a los diversos intereses en diferentes contexos: políticos econòmicos y organizativos (Duddy et al., 2016).

In 1770, Jean-Charles de Borda introduced the Borda Count in an attempt to introduce a method which would be fairer than majority voting for environments with more than two options. His system calculates points to each choice according to its ranking in the preference lists of each voter. To make that happen, for example, a top ranked response may be assigned more points, then the next response less, etc. The winning option is the one with the highest cumulative points, an inclusive decision which encapsulates broader preferences as compared to one with the highest voted option (Kilgour et al., 2022).

However, the recognition of Borda Count approach in enhancing the capacity to prevent polarized outcomes due to a balanced consensus (Ahmadi & Herdiawan, 2021). The Borda Count has been successfully applied in fields such as finance and corporate governance, where diverse interests are found. For instance, corporate boards generally utilize this model to rank investment strategies and ensure alignment with diverse objectives, including risk, return and strategic fit (Ashaf et al., 2019). The method, however, is limited, especially in the presence of tactical voting, where participants can strategically manipulate ranking to change outcomes (Kilgour et al., 2022). However, this susceptibility to being manipulated makes the procedure prone to modifications such as the fuzzy Borda wherein fuzzy logic is used with the fuzzy Borda procedure to manage unclear preferences in risk sensitive domains (Zarghami, 2011).

An example for this one is the Condorcet method by mathematician and advocate of democratic values Marquis de Condorcet based on majority rule through head-to-head comparisons. They match each option against every other option, and winning is the option that would win all pairwise contests. Otherwise known as the “Condorcet winner,” this technique highlights democratic principles in a sense that the option that is finally selected over all others is preferred by the majority (Pattanaik, 2002).

In fact, the Condorcet method is attractive because it chooses majority backed decisions, but it is prone to the Condorcet Paradox, where the rankings are cyclic and there is no clear winner. Such a paradox may occur in general in complex decision processes with different opinions and complicates the applicability of this approach in practical situations (Gehrlein and Valognes, 2001). These cycles are however adressed through adaptations such as iterative Condorcet, which allows stable majority outcomes across iterations. Especially in public policy and economic settings, a majority supported outcome is important (Pérez Fernández & de Baets, 2019).

Advantages and tradeoffs of the two approaches are already documented in the context of the Borda and Condorcet methods. Reflecting inclusiveness by capturing the entire range of preferences, Borda's system is useful for decisions that need broad representation of diverse interests, for instance those encountered in corporate governance or financial committees (Bradley & Wagner, 2012). For instance, in an investment board setting, the Borda Count ensures that the decisions made in the course of the board, be closer to the collective preferences of all the members, making them closer to equality and hence various preferences are reflected (Herrero & Villar, 2021).

For instances where strong majority support is of importance, on national policy referenda or regulatory decisions for example, the Condorcet method is usually called for. For those kinds of decision which require broad public support, the majority rule framework is a good fit, uniting behind the winning option with Condorcet's pairwise comparisons (Liao et al., 2020). For this reason, however, the Condorcet method is usually used with hybrid approaches which overcome the cyclic preference issue, delivering stable outcomes for large scale decisions.

Both methods have been theoretically and practically enhanced to address inherent limitations. For instance, the fuzzy Borda Count provides resilience in contexts of uncertain decision by permitting only partially ranked or vague preferences. The wide application of this version stems from the fact that stakeholder preferences are not always clear but must be represented in a structured decision process as in risk management and environmental decision-making problems (Zarghami, 2011).

Iterative adaptations of the Condorcet method to evolve to the optimal individual vote also deal with the paradox of cyclical preferences and in particular, when multiple votes are cast or preferences need to be adapted to changing preferences over time (Neveling & Rothe, 2021). For example, in corporate governance, iterative Condorcet is flexible to direct decision makers to revisit their selected choices as conditions change, resulting in more stable decision making over many rounds.

### *Applications*

Given structured nature of capturing group preferences, the Borda Count and Condorcet methods, cornerstone to social choice theory, have been applied in corporate and macroeconomic situations. The benefits of these methods are particularly clear in corporate decision making, where bargaining between different stakeholder interests is of great importance, and in macroeconomic situations, particularly for political referenda, in situations where broad public support is often necessary. The ability of social choice theory to relate to these areas shows the theory's relevance to actual decision making, when having to establish collective preferences for stability and legitimacy.

### *Corporate Decision-Making Applications*

Borda and Condorcet can be used as voting mechanisms to aggregate diverse preferences to a joint outcome in critical decisions required for mergers, acquisitions and investment strategies in corporate governance, where board members or shareholders are involved. For example, the Borda Count is ordinarily used in a board meeting to rank the options of strategic importance according to criterion, i.e., return expected, risk, and alignment of the long-term goals (Ashaf et al., 2019). The Borda method allows every member to rank options (assign points) based on the preference of each member rather than just the top choice. However, it is particularly helpful for those establishments with multiplex objectives and numerous stakeholders, where decision choices are commonly broadly approved for smooth working and help of picked methodologies (Bradley and Wagner, 2012).

With a majority rule approach through pairwise comparisons, the Condorcet method has an additional benefit for corporations, where consensus matters most. For example, for

choosing a CEO or approving major changes to a corporation, the Condorcet solution prevails to pairwise comparisons with every alternative and hence guarantees that the final selected alternative is broadly supported. It shares the rationale of guaranteeing a choice which satisfies the most stakeholders (or reduces the conflict if possible) by forcing the winning option to beat each other alternative in a pairwise comparison (Gehrlein & Valognes, 2001). But the Condorcet Paradox can afflict corporate boards - when no option always wins every pairwise comparison - and is likely to do so in the more complex and competing preference scenarios encountered by boards (Pattanaik, 2002).

***Applications in Macroeconomic Contexts and Political Referenda***

For example, in macroeconomic contexts, or in political referenda, Borda and Condorcet are tools for increasing democratic legitimacy, that is, tools to ensure that the outcome of the aggregation will represent the preferences of the broad public. National policy issues or economic reforms political referenda need to be subjected to a structured decision-making process so as to gauge public sentiment accurately. For example, the Borda Count is beneficial in multi option referenda, when voters can rank different policies rather than simply selecting one. By this, a wider range of the public's opinion can be displayed, and the finalist chosen will match the whole mass of the electorate interests rather than just the majority preferences (Herrero & Villar, 2021).

The Borda Count then is an illustrative application of a voting procedure in a political context where the preferences of voters could in theory be ranked to consider not only the order, but also the intensity of the preference between multiple policy options. The Borda method could yield the consideration of voter's priorities other than a binary choice, evaluating preferences over alternative solutions for instance between increased autonomy versus full independence (Duddy et al., 2016). This in turn helps Borda avoid polarized outcomes, by allowing all positions to affect the result, in a reflection of the spectrum of public opinion.

However, the Condorcet method is very well suited for binary-choice referenda as well as any situation where recognizing the preference of the overall majority is desired. Let's say, for the 2015 Greek referendum on austerity measures, the Condorcet method could have been used to determine which economic policy is favoured by the people, provided that the

final choice would have beaten other options in a contest of two at a time. Pairwise comparison approach of the method conforms to the democratic ideals so it can be usefully applied in the decisions that demand strong public opinion endorsement (Nurmi, 2002). With Condorcet's majority rule as a guarantee, the chosen option reflects the broadest possible agreement of preference, hence decreasing the possibility of contentious results with insufficient backing of the public (Liao, et al., 2020).

With its comparative strengths, the Borda method can be applied to different macroeconomic scenarios (1). The Borda Count captures nuanced public opinions in a complex plural referendum as this system ranks based on broader societal preferences. By including more of the tastes represented by lower ranked preferences alike, this openness mitigates the chances for divisive outcomes, qualities that are important for macroeconomic policy decisions affecting the welfare of a nation for longer periods (Zarghami, 2011). Conversely, the Condorcet method is ideal for simpler, majority-driven choices that necessitate decisive action based on the strongest public preference, such as votes on economic or social policies that affect national stability.

Both methods also contribute to enhancing transparency and trust in political referenda by visibly capturing and representing collective preferences. When applied thoughtfully, they foster a greater sense of legitimacy among participants, as outcomes reflect collective rationality and address the interests of diverse groups (Neveling & Rothe, 2021). These qualities make Borda and Condorcet not only theoretical concepts in social choice but practical tools for effective decision-making in corporate and macroeconomic domains.

### 2.3. Mathematical Analysis: Borda and Condorcet Methods

Social choice theory forms its mathematical foundation in laying the groundwork for understanding and analyzing collective decision-making systems. The most important contributions to studying aggregation problems are the Borda method and the Condorcet method which are based on principled axioms (albeit axioms to be found wanting) for the aggregation of individual preferences into a socially coherent outcome. In particular, these methods of estimating the behavior of populations are particularly relevant in contexts where one is forced to make compromises between fairness, consistency, or practical

applicability (as is often the case in environments like financial governance or decisions in macroeconomic policy, Brandl & Peters 2019).

According to the Borda method, illustrated in Nitzan (2009), a scoring rule is applied, as individuals rank alternatives, and following this assignment of points is made for which position in the rankings each alternative occupies. The winner is declared to be the alternative with the highest total score. This method, which is celebrated for the capture of intensity of preferences and thus of the more nuanced expression of collective will, is discussed. Yet, as discussed in the axiomatization of scoring rules such as the Borda method, the system admits the virtue of strong orders over preferences, which amounts to a very strong demand on voters to rank all alternatives without ties. With this assumption the aggregation process is consistent, but with potential vulnerability for strategic manipulation.

The Condorcet method takes a pairwise comparison. If such a candidate exists, it determines the winner to be the alternative that would defeat every other alternative in head-to-head comparisons. As I argued above, this approach is consistent with the majoritarian principle and is robust against certain kinds of strategic voting, as Nitzan (2009) analyzed. Nonetheless, the method is not without challenges, as evidenced by one of the longest standing problems in the literature — the Condorcet Paradox — which inductively proves that cycles can and do emerge in collective preferences and actually 'prefer' themselves (i.e. fail to show a winning alternative), even when the preferences of individual voters are rational. The gist of this paradox represents the complexity of aggregating preferences in wide ranging environments.

To apply these methods in practice the necessary mathematical rigor behind these methods is essential. They each assume the existence of formal axioms like neutrality, anonymity, positive responsiveness which ensure properties to reveal desirable properties of the social preferences. For example, neutrality allows the collective outcome to be irrelevant of the labeling of alternatives, while anonymity says that all the voters are treated equally. A second critical axiom, positive responsiveness, guarantees that improved support for an alternative raises its status in the collective decision (Heckelman, 2003).

These methods are not purely theoretical, rather their mathematical formulations can be harnessed for real world cases. This sensitivity of the Borda method to the preference intensity can be useful in corporate governance where stakeholders' ranking of investment priorities is crucial in financial decision making. In addition, like the Condorcet method, attention on the majority preferences in macroeconomic policy referenda (Brandl & Peters, 2019) seems to parallel with the democratic goals.

The Borda and Condorcet methods are attributable to the power of mathematical formalization to take social choice problems seriously. These have distinct mechanisms and axiomatic underpinnings, which are valuable tools for analyzing and solving collective decision problems featuring irreversible actions. Nitzan (2009) points out that in discussing and evaluating their potential for use in various domains—such as in politics, economics—all of these methods need to be understood on their theoretical and practical dimensions.

### *2.3.1. Mathematical Framework of Borda*

The Borda rule is a basic scoring method in social choice theory and is particularly important on its own merits (simplicity, ease of aggregation of individual preferences into a collective decision), as well as for being a benchmark-to-benchmark other social choice rule. Nitzan (2009) formulates an engineering tradeoff problem following mathematical formulation, which satisfies axiomatic properties and employs specific scoring rules to ensure fairness and consistency in irrational decision making.

#### *Definition and Scoring Rules*

The Borda rule applies to a set of $k$ alternatives $A = \{a_1, a_2, \dots, a_k\}$ and n voters, each ranking the alternatives from most to least preferred. Points are assigned based on the ranking provided by each voter. Specifically, an alternative ranked r-th by a voter receives $k - r$ points. The total score $S(a_i)$ for an alternative $a_i$ is calculated as:

$$S(a_i) = \sum_{v=1}^{n} (k - \text{rank}_v(a_i)),$$

where $\text{rank}_v(a_i)$ is the position of $a_i$ in voter v's preference order. The alternative with the highest cumulative score is declared the Borda winner. In cases of ties, additional rules may be applied to break the deadlock (Heckelman & Ragan, 2021).

***Example Calculation***

Consider three alternatives $A = \{x, y, z\}$ and three voters with the following preferences:

- Voter 1: x≻y≻z
- Voter 2: y≻z≻x
- Voter 3: z≻x≻y

Using the scoring rule $\text{score}_v(a_i) = k - \text{rank}_v(a_i)$, calculate the total scores:

- For x:

$$\text{score}_1(x)=3-1=2,\ \text{score}_2(x)=3-3=0,\ \text{score}_3(x)=3-2=1$$

$$S(x)=2+0+1=3S(x) = 2 + 0 + 1 = 3$$

- For y:

$$\text{score}_1(y)=3-2=1,\ \text{score}_2(y)=3-1=2,\ \text{score}_3(y)=3-3=0$$

$$S(y)=1+2+0=3$$

- For z:

$$\text{score}_1(z)=3-3=0,\ \text{score}_2(z)=3-2=1,\ \text{score}_3(z)=3-1=2$$

$$S(z)=0+1+2=3$$

In this case, all alternatives receive the same score (S(x)=S(y)=S(z)=3), demonstrating a tie.

***Axioms Satisfied by the Borda Rule***

The Borda rule is characterized by several axiomatic properties that highlight its effectiveness and limitations in preference aggregation:

- Neutrality: It labels all alternatives symmetrically, such that choice of a labeling has no effect on the outcome.
- Anonymity: No voter is treated differently than any other voter, the outcome only depends on the preferences expressed and not on the identity of the voters.
- Faithfulness: If there is one voter, then we take that voter's top and that will be our winner.
- Consistency: If two sets of voters rank independent alternatives and arrive at a consensus winner, then the group as a whole will agree with the winner.

Young (1974, as mentioned in Nitzan (2009)) shows how the Borda rule is robust under these properties. Nevertheless, we should mention that Borda rule is not vulnerability to strategic manipulation and may fail to select the Condorcet winner when such winner exist.

### *2.3.2. Mathematical Framework of Condorcet*

The Condorcet method concerns a principal theme of social choice theory, namely, the use of the principle of pairwise comparisons to determine collective preferences. The specifics of the pairwise comparison phase of the Condorcet method are elaborated, a practical example is provided and axiomatic properties the Condorcet method satisfies are discussed focusing in particular on their use in macroeconomic decision-making (Heckelman & Ragan, 2021).

#### *Pairwise Comparison Process*

The Condorcet method evaluates alternatives by comparing them in pairs. For a set of k alternatives $A = \{a_1, a_2, \dots, a_k\}$ and n voters, each voter expresses a strict preference order over the alternatives. For each pair $(a_i, a_j)$, the number of voters who prefer $a_i$ to $a_j$ is denoted by $V(a_i, a_j)$. The alternative $a_i$ is said to "win" against $a_j$ if $V(a_i, a_j) > V(a_j, a_i)$.

An alternative is called a Condorcet winner if it defeats all other alternatives in pairwise comparisons:

$$\forall a_j \in A, a_j \neq a_i, V(a_i, a_j) > V(a_j, a_i).$$

If no such alternative exists, the outcome of the pairwise comparisons may exhibit cyclical preferences, a phenomenon known as the Condorcet paradox.

***Example and the Condorcet Paradox***

Consider three alternatives $A = \{x, y, z\}$ and three voters with the following preference orders:

- Voter 1: x≻y≻z
- Voter 2: y≻z≻x
- Voter 3: z≻x≻y

The pairwise comparisons yield the following results:

- x vs y: $V(x, y) = 2$ (Voters 1 and 3 prefer x to y), $V(y, x) = 1$.
- y vs z: $V(y, z) = 2$ (Voters 1 and 2 prefer y to z), $V(z, y) = 1$..
- z vs x: $V(z, x) = 2$ (Voters 2 and 3 prefer z to x), $V(x, z) = 1$.

In this case x defeats y, y defeats z and z defeats x.

The result is a cycle (x≻y≻z≻x), demonstrating the Condorcet paradox, where no single alternative emerges as the overall winner despite individual rational preferences.

***Axioms Satisfied and Macroeconomic Utility***

The Condorcet method adheres to several critical axiomatic properties:

- Majority Rule: That means if a majority prefers one alternative to another, the group decision will reflect that preference.
- Neutrality: The method treats the options all equally, so the result does not depend on how we label options.
- Anonymity: So, outcome is independent of voter identity since they are all treated equally.
- Pareto Efficiency: For instance, if all voters prefer one alternative over another the group decision must do the same.

The properties of such method highlight its fairness and robustness in aggregating preferences, especially in macroeconomic contexts. For instance, in the case of national referenda, for instance, decisions whether to approve a certain fiscal policy or to enter into

a particular trade agreement should be guided by the majority rule, for this way the electoral choices would reflect the predominant societal preference. However, the Condorcet paradox tells us that one can run into problems where there are cyclical preferences, so 'alternative mechanisms, or alternative rules for breaking ties' as he puts it, are necessary to solve ambiguities. The Condorcet method gives us a mathematically precise way to aggregate societal preferences and understand the process of making group decisions. The relevance of this follows in its application to macroeconomic decision making especially in case of acts of decision making that require abiding by democratic principles and the rule of majority as discussed in (Nitzan, 2009).

### *2.3.3. Comparison of Mathematical Strengths: Borda vs Condorcet*

There are two crowning methods in social choice theory, namely the Borda method and the Condorcet method whose mathematical characteristics and practical advantages are different from each other. Nitzan (2009) can be drew upon to insights about accuracy, transparency, and amplification in the financial and macroeconomic contexts concerning the two methods in this section.

#### *Accuracy in Aggregating Preferences*

In the Borda method a scoring rule is used according to which points are given to alternatives with respect to their rank among the individual voters' preferences. This method represents the intensity of preference: the final decision represents not only the order of the preferences, but also relative strength of preference for each alternative (Brandl & Peters, 2019). Mathematically, the Borda score for an alternative ai is calculated as:

$$S(a_i) = \sum_{v=1}^{n} (k - \text{rank}_v(a_i)),$$

where k is the number of alternatives, and $\text{rank}_v(a_i)$ is the position of $a_i$ in voter v's ranking. This section compares the two methods based on accuracy, transparency, and applicability in financial and macroeconomic contexts, drawing insights from Nitzan (2009).

The Condorcet method, on the other hand, employs pairwise comparisons to identify an alternative that would defeat every other alternative in head-to-head contests. If such a Condorcet winner exists, it is guaranteed to align with the majority preference. The process involves calculating:

$$V(a_i, a_j) > V(a_j, a_i) \forall i \neq j,$$

where $V(a_i, a_j)$ represents the number of voters preferring $a_i$ over $a_j$. This ensures a majority-consistent outcome but does not account for preference intensity, making it more suited to binary decisions or cases where majority rule is paramount.

***Transparency in Decision-Making***

Borda method works very simple and has clear calculation with ranking scores. Its transparency is good in corporate settings since it achieves to instill confidence in decision making processes by stakeholders. But, like any other voting method, if voters can strategically rank candidates, then it can undermine trust.

The downside of the Condorcet method is that it relies on comparisons between two candidates, which can make it less intuitive (the Condorcet paradox), while no Condorcet winner exists. However, this complexity can make the decision process muddled, and they provide resilience against tactical voting: voters cannot exploit the method to pick specific outcomes (Heckelman & Ragan, 2021).

***Applicability to Financial and Macroeconomic Contexts***

In the domain of financial governance, the Borda method succeeds because it captures the intensity of preferences of the stakeholders. For instance, in this respect, it supports a fine-grained project prioritisation within the context of budget allocation. But as Nitzan (2009) warns, it is susceptible to manipulation, which makes is dangerous in high stakes environments where trust is important.

What are suited for macroeconomic decision processes such as referenda on fiscal policy are methods conceived in accordance with the insight of The Condorcet that decision processes should be formed and operated according to the principle of majority rule. It encourages democratic principles by crafting the chosen alternative so that it matches

majority preference and thereby strengthens the legitimacy. Although, its failure to untangle cyclical preference without the help of additional rules makes it unsuitable for direct use in complex decision making (Brandl & Peters, 2019).

***Mathematical Comparison***

Condorcet method meets the majority criterion, which means that if a majority had a preferred alternative, it would always win. In addition, it satisfies axioms such as neutrality and anonymity and is robust, even in a democratic context. At the same time, it can be shown to violate consistency if such preferences are cyclical.

Borda method (not majority-consistent) but cancelling consistency with Nitzan (2009). The strength of this method is in determining an alternative with the lowest average ranking, which should correspond to the collective preference intensity. However, it neither does so guarantee the Condorcet winner nor ones it can be problematic in what may be called 'strict majority situations'.

Each of them has their own mathematical advantages, fit for different situations. Financial applications relying on prioritization or decision making in circumstances where a decision becomes unfavorable when a single voter is totally removed from the landscape could be the best territories for Borda Method of selecting using preference intensity; this method at the same time aligns with majority rule, hence reason why it resonates well where macroeconomics are at play and a decision may come to be unfavorable due to the removal of even a single voter. Knowing these differences helps to choose the best method according to the needs of the case of decision-making. Traditionally, it meets axioms such as neutrality and anonymity, making it robust in democratic contexts. However, it may violate consistency in cases of cyclical preferences.

The Borda method, while not majority-consistent, satisfies axioms such as cancellation and consistency (Nitzan, 2009). Its strength lies in its ability to produce an alternative with the lowest average ranking, reflecting collective preference intensity. However, it does not guarantee the selection of the Condorcet winner, which can be problematic in scenarios demanding strict adherence to majority rule.

Both methods offer distinct mathematical strengths tailored to different contexts. The Borda method's emphasis on preference intensity makes it ideal for financial applications requiring prioritization, while the Condorcet method's alignment with majority rule enhances its applicability in macroeconomic decisions. Understanding these differences is essential for selecting the appropriate method based on the specific demands of a decision-making scenario.

### 2.4 Comparison of Borda and Condorcet

Social choice theory revolves mainly around the problem of aggregating individual preferences into a single collective decision, and two main mechanisms—Borda Count and Condorcet—are central parts of social choice theory. Although all these methods aim at achieving fair representation, their mechanics differ vastly, so do their winner selection process and their outcome consistency. They have consequences for their applications in varying decision-making contexts including corporate governance, financial strategy and political referenda.

In the case of the Borda Count the mechanics are straightforward, it's just a ranking system weighted according to points instructed inversely to the position of each option in the ranking. In such example, it consists of four options during election in which the higher option will be rewarded for highest total points, the second highest for second points and so on. The Borda Count is also powerful in cases where a wide spectrum of consensus is required (as opposed to just a majority, say), because the preferences can be more nuanced; that is a choice ranked low in preference still matters (Kilgour et al., 2022). In situations where organizations take board decisions to rank complex criteria like investment potential, risk variables, and strategic alignment among alternatives, this point allocation framework has an edge (Ashaf et al., 2019).

On the other hand, the Condorcet method is based on pairwise comparisons, where each option is compared to every other option individually. The "Condorcet winner" will be the option which wins all pairwise contests. The criterion of majority rule is at work in this selection of a winner because ultimately, an option is chosen on the basis of it being a winner in direct competition with every other alternative (Pattanaik, 2002). Nevertheless, the method is prone to the "Condorcet Paradox," i.e., when the options do not form any

obvious winner, they cyclically prefer each other (A beats B prefers B beats C prefers C beats A), which is inevitably the case in 2-round voting scenarios. Decisions requiring strong majority backing like policy referenda (Nurmi, 2002) take well to this structure.

The winner selection criteria of the Borda Count are crafted so that the selected outcome is a compromise of all rankings instead of one supported by a strict majority. The main advantage of this feature lies in being appropriate for decision environments that require a wide specification of preferences, including, for example, corporate boards or committees where interest of many heterogeneous players must be aggregated and consensus the goal (Grandi et al., 2016). For instance, the Borda Count can determine which [investment or strategic] option closely matches the overall priorities of the group in a situation where directors rate options to invest or take. Thus, it is not bound that the selected option is the best alternative of each voter, but it chooses the best alternative respect to the different choices the voters are fluctuating towards.

On the other hand, Condorcet's winner selection is stricter, defining robust support as selecting an alternative which will win in all pairwise matchups. However, this approach of finding an option that constitutes the strongest collective preference is good for high stakes decisions requiring a definite majority winner, such as national policy referenda. Nevertheless, in such cases where the preferences cycle such that there is no clear winner, alternative and hybrid methods need to be used to break the cycle of a cyclic outcome. The lack of flexibility, inherent to routing method, limits its applicability in environments with various and sophisticated preferences (Sun & Li, 2008).

The Borda Count and Condorcet method differ primarily on what I will refer to as outcome consistency: Condorcet results tend to have a more stable relationship between preference orders and their associated outcomes than Borda. For one, the Borda Count has an advantage in that its result is a stable consensus outcome from aggregated rankings. The Borda Count captures the full spectrum of rankings and as does so, avoids cyclical inconsistencies but it is still susceptible to tactical manipulation. Tactical voters artificially rank some options lower, to strategically affect the outcomes, for example (Kilgour et al., 2022). Yet this vulnerability makes the Borda Count useful in corporate and financial

decision making for which a stable consensus-oriented outcome is often more desirable than a strict majority winner.

In contrast, the Condorcet method can suffer outcome inconsistency because it can have a cycle in the Condorcet Paradox. Having a disposition to cycle like this makes it harder to decide, as there is no clear majority supported choice. This paradox impedes decision making in those scenarios which need strong majority backing, for instance national economic policies and corporate resolutions (Rothe, 2019). To resolve these inconsistencies, the Condorcet method has been made iterative, so decision makers are able to go back and revisit their options and change their preferences over time. While these adaptations provide some flexibility, they do not fully eliminate the cyclic preference issue inherent to Condorcet's structure.

One major concept used in social choice theory is the Condorcet Paradox: having circular preferences among the options is unable to result in one option winning by a clear majority over a second option in a pairwise comparison. This paradox was named after Marquis de Condorcet, in which there is a group of decision-makers in which none of them is preferred over the rest in the group. Within the realm of finance and macroeconomics, decisions involving multiple stakeholders with conflicting interests, as was the case here where everyone on the team was a swing voter, exacerbates the paradox, especially for those situations where a robust, consensus decision is vitally important for economic stability and strategic alignment (Baumeister et al., 2020).

A paradox arises when a cycle in the group preferences does not specify any particular group option as the winner; Option A is preferred to B, which is preferred to C, which is preferred to A. It also prevents the selection of one 'Condorcet winner' which locks the group into an impasse for decisions where such an outcome is necessary (Nurmi, 2002). This cyclic preference structure, particularly, might impede establishment of a unified decision in financial settings where investment committees or boards rank projects or allocation strategies. If companies cannot make stable decisions, capital deployment may be delayed, or fast-moving markets may be missed leading to lower returns and less shareholder confidence (Herrero & Villar, 2021).

The paradox has similar macroeconomic implications. Cyclic preferences could give public policy and fiscal decisions a poor fit with the decisions of the majority. As an example, referenda or public consultations on economic reforms (e.g., tax changes or trade policies) may show cyclic voting patterns, when they take place in polarized contexts, with several diverse interest groups, such as Liao et al. (2020). Having a method such that there is no underlying clear winner produces political gridlock, which in turn delays timely implementation of essential policies, regarding economic stability and growth.

The Condorcet Paradox has been sought to be overcome with several adaptations and hybrid approaches. For example, iterative voting processes permit decision makers to cycle through preferences over time to smooth out cycles, and to identify majority supported outcomes. In corporate and in macroeconomic settings, these adaptations are important because of the potential for divergent stakeholder priorities to slowly become aligned, so that a consensus choice emerges over time, in cases of repeated decision making, such as budget approvals, or incremental policy changes (Onan et al., 2016).

### 2.5 Advantages and Weaknesses of Borda and Condorcet Methods

Borda Count and Condorcet methods are both of fundamental importance in social choice theory, because each presents a different method to carry out the group aggregation of individual preferences to a collective choice. Despite the simplicity of Borda, their vulnerability to tactical voting is problematic, and the fact that neither of these methods does a good job of representing overall preferences tells against their use. On the other hand, the Condorcet method is reputed to follow majority rule and to be robust, but complications exist, above all where the Condorcet Paradox kicks in in national referenda.

The point ranking system used by the Borda Count is among the main advantages of the voting system and can reflect a wide range of preferences. Voters rank their options in order of preference; then points are assigned inversely relative to the position that each voter's option maintains within his ranking. For example, if you have a four-option election then a first-place choice might get three points, then second place choice might get two points and so forth. The person with the most cumulative points will win. While this mechanism is most effective in consensus situations, due to the consideration of the entire preference spectrum, the chance of a polarising outcome arising from a simple majority, as could have

been the case with a simpler mechanism, is diminished (Kilgour et al., 2022). Instead, this approach is best for corporate board applications, where directors may require consideration of some complex choice, such as investment option, that needs to consider returns and risk along with strategic fit from several different perspectives (Herrero & Villar, 2021).

In particular, the inclusivity of the Borda Count is invaluable when the preferences of participants are so diverse. On the other hand, Borda as a reflection of the preference profile in the case of compromise and cooperation in corporate governance is quite balanced. Including the preferences of all participants, and taking into consideration the rank of each option, the Borda Count is a good way to reach decisions that are supported by all participants, as seen by boards or committees that need to find consensus on strategic priorities (Ashaf et al., 2019). The compromise solution that may prevent deadlock or division of stakeholders recommends that the Borda Count works quite well in a corporate or organizational context.

The Borda Count has one remarkable advantage: simplicity. It has an easy-to-use mechanics of ranking and point allocation which eliminate time and resource spent in calculation and decision making. In this aspect, this efficiency is particularly worthwhile in contexts where many decisions have to be made frequently or quickly as in project planning, corporate policy review (Ahmadi & Herdiawan, 2021). Because of its simplicity, the Borda Count may become a favorable choice for organizations with little time for formal voting processes as compared to more complex voting methods.

The Borda Count has one advantage, but it is vulnerable to tactical voting. Consequently, the Borda outcome is based on relative ranking, not a strict majority preference, which makes that outcome susceptible to manipulation by the participants. For example, a voter might position a less preferred option even lower in their ballot, out of concern for ensuring that their preferred option gains standing over other options. This kind of “tactical voting” can warp the outcome and defeat the intended collective expression of sentiment (Kilgour et al., 2022). This vulnerability is harmful in competitive or high stakes environments where participants might be incentivized to refrain from reporting uniquely personal or group interest preferences impartially.

However, like political elections or choice of companies in matters that affect great sums of money, tactical voting can ruin the inclusivity method. This vulnerability has been suggested by scholars as one of the reasons why flaws in the Borda Count must be adapted through weighted versions which place more weight on middle rankings. Another approach is based on fuzzy logic and allows for uncertain preferences, limiting manipulation, especially in areas such as environmental planning and risk assessment (Zarghami, 2011). Despite these adaptations lowering vulnerability, the Borda Count also remains vulnerable to strategic voting.

Being extremely strict to majority rule is a real strength for the Condorcet method, and it's robust in situations where it needs to be backed strongly by the public or by stakeholders. This system is based on comparing the individual option in the system against each individual option in the system in a series of pairwise matchups. The "Condorcet winner," the option that would beat out every other option in a head-to-head contest, is the winner, if there is one (Pattanaik, 2002). The ineluctably logical combs, or collects, the 'most averaged' option between each other alternative and writes it down as the desired decision; this method applies only to high stake political or economic decisions whose subsequent practice is dictated by but one choice.

Condorcet fits with a focus on the majority precisely; such decisions are most appropriate with nationally directed referenda and public policy decisions for which a strong majority is necessary for legitimacy. For instance, in a referendum Condorcet guarantees that the winning choice will be supported, as much as possible, by the whole electorate, hence making opposition minimal. Additionally, the nature of this robustness against manipulation makes Condorcet a useful procedure in the impartial sense as outcomes won't be easily modified by individual rankings because it is built on head-to-head comparisons (Liao et al., 2020).

The Condorcet method is certainly strong, but it has its drawbacks. So, if a set of preferences cycles between the options, causing no single option to win all pairwise comparisons, we call this the "Condorcet Paradox." For example, then, we might judge that Option A is preferred to Option B, and B to C, and C to A — forming a cycle with no

clear winner. Thus, this paradox could neutralize a conclusive preference, what makes it puzzling in those contexts where a stable outcome is called for (Nurmi, 2002).

The paradox in national referenda can cause decision deadlock, when no option receives majority support in head-to-head comparisons. In polarized environments, this scenario is even more problematic — it could leave decision makers with no clear course resulting in political or organizational gridlock. It also reflects in that the method's stark dependence on strict majority support and the limits in preference entailment situations where preferences are very disaggregated (Neveling & Rothe, 2021).

This Condorcet Paradox has been addressed with iterative versions of the Condorcet method. By permitting repeated voting rounds, these adaptations can stabilize preferences over time and reveal a majority rival for an option useful in policy environments where conditions may change and accordingly preferences might shift. These adaptations still left the paradox as a constraint to consistency and applicability of this method in some contexts, specifically national policy referenda that necessitate a clear and decisive outcome (Naura & Purnawansyah, 2024).

### 2.6 Applications in Finance and Macroeconomics

Both the Borda and Condorcet methods have been applied for meaningful purposes in finance and macroeconomics to capture a feature of various stakeholder preferences in structuring highly nonlinear decision-making problems. The methods are helpful for financial governance, including investment strategy selection, and the macroeconomic policy referenda, by providing structured frameworks for the aggregation of individual preferences. We can see, through case studies and examples how these methods are used in navigating financial and economic challenges balancing varying priorities.

When selecting among strategic investments or project proposals, the Borda Count is widely applied, because it uses a ranking-based point allocation system. However, the Borda method has a noteworthy strength, namely, that it can capture a full spectrum of preferences across stakeholders; it is useful in situations for which compromise, and representation are important (Kilgour, Marczak, Cook, Liston-Heyes, Puppūn, & Schofield, 2022). When it comes to corporate decision making, board members often must

select projects that fit within the company's financial goals while keeping risk and strategic priorities in tension. Under the Borda Count, ranked preferences are aggregated to ensure that all options are considered so the boards can make balanced choice of what best suits their collective priority (Ahmadi & Herdiawan, 2021).

For example, the Borda Count might be used by a corporate board evaluating several possible mergers, when they seek to choose the best investment opportunities, evaluated using projected returns, risk, market impact, and alignment with long term strategy. Then each Board Member ranks each proposal, and the Borda Count is used to aggregate those rankings into a final score for each proposal. The Borda count captures the collective preferences of the entire board which helps identify an investment that comprises broadly the elements of collective investment priorities without being everyone's first choice (Herrero & Villar, 2021).

Besides project selection, the Borda method is also useful for strategic corporate governance issues, for instance, budget allocation voting or voting for operational expansions. For example, in a multi department company where each sets their own sets of ranking priorities for resources, then using the Borda Count considers the relative set of priorities in the company, avoiding a simple majority. In this way, this approach works best in keeping cohesion across the scattered organizational units, choosing the options that reflect overall strategic alignment of the organization. However, in competitive, high stakes corporate settings the Borda Count is not resistant to tactical voting; participants can rank some options lower or higher to sway the outcome (Kilgour et al., 2022). While such inclusivity is critical for aggregating a diversity of preferences, in the case where complete representation of stakeholders' view is critical, its function in aggregating preferences makes it an imperative tool for corporate governance.

In the world of finance, pairwise comparisons, which is also known as the Condorcet method, is valued for its majority backed decision making ability, especially when its needed to come to a clear preference. What makes this so useful in a high stakes scenario, when deciding the strategic direction of the company or approving major policy changes for example. In the second instances the Condorcet method ensures that the final choice is

unbeatable in comparisons in pairs of alternatives against each alternative hence is certain to have broad support among stakeholders (Pattanaik, 2002).

In multinational corporations, the Condorcet method has one practical application, i.e. in strategic planning. The Condorcet method can be used by executives to compare directly between competing strategies — such as expanding into new markets versus enhancing existing product lines —, when a company needs to make the tradeoff between the two. One strategy is compared and paired against all other alternatives; that one strategy which beats all other alternatives in pairwise comparisons is selected. In addition, this approach is especially valuable in decision making involving a large board of directors or an executive team due to the weight given to decisions that have majority support, and the recommendation thus is very similar to what would be ultimately best for the whole organisation (Gehrlein & Valognes, 2001).

The method of Condorcet is also applicable in the case of the discussion of organizational financial policy. For instance, in risk management, financial regulations or ethical investing policies setting at the company wide level, the Condorcet method assists in selecting the most supported policy by different departments or units in the company. It hence can lower the chances of dissent, in that the final policy is the one that a majority of decisionmakers prefer. The method has its limitations, however, most notably in its vulnerability to cyclical preferences (Condorcet Paradox), which can make it difficult to apply to the situation of fragmented or diverse preference (Nurmi, 2002).

The Borda and Condorcet methods are useful approaches to deal with the complex national decisions which concern very large populations at the macroeconomic level. One primary example of this application is in the context of referenda on economic reforms in which both methods suggest modes to capture public sentiment, while trying to minimize polarization. The Condorcet method provides a good method for binary referenda because it involves a majority rule, and the Borda Count is good for referenda with several alternatives because it averages all preferences.

One such case study is the 2015 Greek referendum on economic austerity measures by way of national debt and economic reform, where the question was put to voters on a policy track that the country has been on for its entire lifetime. Whereas the referendum offered a

dichotomy, modeling the referendum in the framework of pairwise comparisons, using the Condorcet method, would have enabled the measurement of the level of public support for other economic strategies. Thus, for example, if among the additional options there were modified austerity or debt renegotiation, the Condorcet method guarantees that a winning option has majority in the head-to-head comparisons. This would allow for the results of the referendum not to become polarized and to be less detached from majority preference (Liao et al., 2020).

Where national referenda have multiple options, such as the Scottish independence referendum, the Borda Count could possibly provide some insight into public opinion more nuanced that a simple yes or no vote. Voters could choose between different amounts of autonomy or independence, like remaining in the union with high devolved powers, independence or staying put. Finally, the Borda Count aggregates these rankings, (Duddy et al., 2016) identifying what option represents a consensus in the population, and not just a binary decision — a utility that reduces the polarization of outcomes and offers a stronger representation of how the group prefers to vote. Unfortunately, the Borda Count suffers from one possible vulnerability to tactical voting, where participants try to 'game' the system to rank the way they want.

These methods find as well use in economic policy making and budget apportionment in which complicated preferences need to be compromised among disparate interests. The Borda Count can be used by policymakers to rank priorities by sector, such as healthcare, education, and infrastructure, for example, in government budget allocations and appropriate planning, if the Borda Count score tallies up for each sector in line with the number of public needs represented, to reflect an inclusive representation of public needs. Then each sector could be ranked by its importance and the final budget assigns resources according to the aggregate rankings. Particularly, this approach is useful in participatory budgeting process, where citizens or stakeholders contribute to the decision-making process, this method captures the differences in preferences and returns a balanced outcome (Herrero & Villar, 2021).

The Condorcet method is good to use in economics when making policy when we are trying to determine policy proposals that have different trade-offs, such as tax reform or

environmental policies. The Condorcet method enables policymakers to compare each proposal against other alternatives, so that the final decision is the one with the most majority support in head-to-head comparisons, in other words the strongest preference among the stakeholders. In policy areas requiring public support (for example national policy on healthcare or energy) the Condorcet method's resistance to manipulation offers an additional legitimacy. There is, however, a downside, as the Condorcet Paradox, that prevents the existence of a clear winner and which can also result when preferences are cyclical or fragmented, could still lead to a failure (Neveling & Rothe, 2021).

## 3. Group Agency and Collective Decision-Making in Social Theory

### 3.1. Introduction to Group Agency

What is group agency? The study of group agency is central to collective decision making and revolves around the ability of a group to act as a single agent, with intentions and with responsibilities that even exceed the sum of its parts. Understanding structured decision-making systems such as those analyzed with Borda count and Condorcet voting depends on understanding this concept. Beyond philosophical interest, group agency is significant in political science, organizational behavior, and sociology (Laughlin, 2011), partly because the acceptance of group agency entails accepting the causal and moral significance of group conduct within collective bargaining, corporations, hospitals, prisons, the military, families and other groups.

The system of decision making, that is designed to use individual preferences to arrive at a collective choice while aspired for a group level rational outcome is called structured decision-making system. Other methods such as the Borda count, Condorcet voting, and many others represent attempts to strike a compromise between the individual preferences of the group's members, and the rationality of what constitutes a group rational decision. The Borda count weights ranked choices, so preferences are aggregated in a nuanced way; the Condorcet method identifies a winning candidate who beats out all other candidates in one-on-one comparisons. Among them, these illustrate the dynamics of the functioning of group agency about the functionality of the agents and the processes of decision making that rely on the agents' overall consistency of inputs to reach a common goal (Hwang & Lin, 2012).

The difficulties of adjunction of individual rationality with collective rationality persist as part of the discussions on collective agency. Normally individual rationality is based on the ground of self-interest and priorities, then collective rationality is a fusion of all these individual rationalities. One can better understand collective intentionality as the basis for group agency away from the ontological tangles raised by scholars like John Searle. Searle's work illustrates shared beliefs and intentions allow for the collective function to be assigned to individuals and objects and complete the collective action that operates in a system (Searle, 2010).

Additionally, social theory has taken up the problem of the relation between individual and collective rationality as a recurrent theme. Niklas Luhmann asserts that the functional differentiation of modern society now makes it difficult to conceive of the unified group agency that characterized many premodern institutional arrangements. According to Moeller (2011), Luhmann proposes that decision processes are becoming more independent of rationalities of specialized subsystems with autonomy. The difficulty of striking a consensus in highly differentiated societies burdened by competing priorities and values — where divergence is the norm, not the exception — only goes to underscore what's now happening.

As with practice, group agency also comes to terms with power dynamics and representation. The practice of aggregating individual preferences into a single collective decision sometimes rewards some voices but silences others. It starts to raise some ethical questions around equity and inclusion of those within decision making frameworks. Examples of scholarship on collective decision-making include examining how systems of power and privilege shape the outcomes of collective decisions (Verweij et al., 2015); and how to ensure fair representation (Verweij et al., 2015).

Moreover, the implications of the interplay between individual and collective agency for the legitimacy of decision-making systems are considered. The credibility and acceptance of the participants to such systems are endangered if their individual preferences are insufficiently considered. On the other hand, over-individualistic approaches may overlook the kind of social context that would make cohesive group action possible. To encourage trust and cooperative behaviour in the collective entities, these dimensions need to be balanced (Laughlin, 2011).

This thesis approaches collective decision making through the critical lens of the concept of group agency. Structured decision-making systems attempt to construct coherent and equitable outcomes by resolving the challenge of reconciling individual and collective rationality. Searle and Luhmann make theoretical contributions that shed light on both the ontological and the functional dimension of group agency and argue for group agency's place within contemporary social theory. Such understanding and optimization of group

agency will remain a central concern to scholars and practitioners as societies become increasingly complex.

### 3.2. Collective Intentionality in Social Theory

The concept of collective intentionality, based on John Searle's account, along with the foundational role that institutional facts play in structuring human interactions, is properly understood as the fundamental features of the exploration of collective decision-making in social theory. According to Searle's theoretical framework, shared mental states represented as collective intentionality, help establish and maintain institutional realities (Searle, 2010). By offering this perspective, we shed light on the mechanisms behind how decision-making frameworks such as the Borda count and Condorcet methods rely on norms and mutual recognition of the social groups (Verweij et al., 2015).

The ability for such individuals to engage in shared mental states which exceed the sum of individual intentionality is referred to as collective intentionality. Searle argues that institutional facts, facts that obtain not because of their physical properties but from collective human recognition and agreement, depend upon this phenomenon. This shared recognition gives rise to functionality of currency, or of political offices and authority for example (Searle, 2010). These institutional facts would have no legitimacy to impact individual or collective behavior without collective intentionality.

Searle's major point is that institutional facts get their power from constitutive rules —e.g., "X counts as Y in C." This framework provides a structured environment whereby roles and responsibilities are clear and stated such that those who operate within the environment do so based on common expectations. This structure is especially apparent in systems for aggregating collective preferences to select a group's choice in decision making contexts; for instance, the Borda count. Legitimacy of such systems is not just that the process is mathematically or logically robust, but also if the community using such systems accept it as a valid mechanism (Hwang & Lin, 2012).

Institutional facts moreover play a critical role in the reconciliation of individual and collective rationality. A key challenge in making decisions in a group setting is ensuring that individual preferences are in accord with outcome that capture the welfare of a

collective group. Searle's theory points out that this same alignment can be realized via the enforcement of helped norms and rules, which steer individuals' behavior towards collective interests. A particularly good example of this phenomenon is seen in Condorcet's voting method, where we attempt to find the option that will beat any other option in pairwise comparison. This method presupposes a commitment to fairness and a rationality that can be sustained only under a rubric of institutional legitimacy (Searle, 2010).

In the context of decision-making frameworks, Searle insight into collective intentionality shows how individual actions interplay between institutional structures. To properly operate these systems, they require shared understanding of the situations and shared agreement about the best way to go, highlighting the interdependency of structured decision making and institutional facts stability. For example, it can be claimed that the Borda count and Condorcet methods as ways of resolving conflicts or choosing 'god' work only because the participants believe them to be fair and useful. Without shared intentionality such methods would risk losing their legitimacy and operational coherence (Laughlin, 2011).

Searle's theory of decision making is not an abstract philosophical construct. This has practical implications about how to understand and change governance, organization behavior and societal coordination. Acknowledging collective intentionality as foundational to the design of decision-making systems permits consideration of promoting trust and cooperation among participants, agents that know they are participating in a system that aggregates their preferences can invest in it, creating an equilibrium where all participants are best off. By following this comparatively systematic approach planners ensure that institutional frameworks are resilient and adaptive to changing social dynamics (Searle, 2010).

The concept of collective intentionality presented by John Searle is a powerful tool for the investigation of what underlies the emergence of group agency and group decision making in social theory. Searle's approach presents decision making processes as inherent elements of institutional facts, and shared intentionality, which emphasizes the importance of legitimacy, mutual recognition, as well as structured norms, to enable effective collective action (Searle 2010). Principles such as Borda count, and Condorcet method represent

practical application of these and make a strong case that a mechanism to arrive at shared intention between individuals and the collective could be the key to overcoming the divide between individual and collective rationality. Having such a perspective deepens our theoretical understanding and make suggestions that should influence implementation and design of decision-making mechanisms in other social contexts.

### 3.3. The Dynamics of Functional Differentiation and Collective Agency in Complex Systems

Niklas Luhmann's theoretical framework is built on functional differentiation, which provides a deep view into how to understand group agency. For this concept argues that modern societies are not hierarchically stratified societies, but rather societies structured by autonomous systems each employing its own field of action and logic. The move away from the classic social models of organization changes how collective agency is understood, made meaningful, and bounded within contemporary social systems (Moeller, 2011).

Functional differentiation theorizes that society is organized as sets of self-contained sub systems such as politics, law, economy and education, which have their own peculiar operational codes. Functionally differentiated societies, by contrast, diffuse agency across these specialized systems, and do not concentrate in the upper echelons of stratified societies. This dispersion makes the collective decision making difficult to pin down in a single system as no one system provides a view of all. The work of Luhmann (1984 in Baxter, 2013) highlights that these systems are autonomous, dependent upon their internal structures instead of external distinct (Baxter, 2013).

The fragmentation of collective agency is one implication of functional differentiation. Where subsystems operate independently, aligning their goals to form unified decisions becomes more and more complex. Economic systems do well in efficiency, profit; and legal systems do well in justice and equity, for instance. This divergence is indicative of the inherent difficulty of group decision making in favor of coherence. Luhmann looks at this lack of coherence as not a deficiency, but as a basic attribute of modern society (Moeller, 2011).

Luhmann's framework additionally criticizes the usual anthropocentric perspective of agency. Instead of confining agency to human actors, his systems theory extends agency to communication processes that delimit and maintain each subsystem. In such view, agency is not a property of an individual, but an emergent phenomenon of their interaction with and between systems. Such a view turns conventional social action theories on their head, which usually conceive of social actions as following some linear trajectory form individual intentions to collective outcomes (Lee, 2000).

Realizing collective agency is further complicated by operational closure of subsystems. Although these external influences affect a subsystem, the internal logic of a subsystem defines how this external input is interpreted and used. For instance, economic considerations are an example of a political decision, however it must be maintained so that it remains in sync with the code of governance for the political system. The contingent nature of collective agency as dynamic is underscored by the same, Moeller (2011).

Most importantly, Luhmann's theory shows the pitfalls of traditional decision rules, e.g. Borda and Condorcet. The problem with these models is that they rely on the assumption of a rational coherence that is unrealizable in functionally differentiated societies. For example, the Borda count aggregates persons preferences to yield a collective choice. But aggregation in such a system of divergent priorities and competing logics may not represent the many faceted and contentious nature of collective agency. Likewise, the Condorcet method in which a candidate that can beat all other candidates in pairwise comparisons is sought, presumes a level of stability and consistency that rarely exists in practice (Baxter, 2013).

Associated with this insight is the idea that dispersal of agency in functionally generated societies also troubles control. In the conventional hierarchical system, the ability to direct and oversee is placed by virtue of the power to make decisions at the apex. Meanwhile, modern societies have no central authority to steer the whole. However, decision making is realised via distributing among many subsystems with their own mechanism of control and feedback. Adaptability is privileged over control with modern expansion (Moeller, 2011), a logic that is expressed in this decentralization.

Though critical of the traditional models, Luhmann's theory gives useful insight into the dynamics of group agency. Its focus on communication processes and system interdependencies provides a nuanced view of how groups make and are constrained to make collective decisions amidst complex social systems. In addition, it emphasizes the need to understand the limitations of the conventional frameworks and the need to explore alternative ways of considering the realities of what is called here 'functional differentiation' (Baxter, 2013).

Luhmann's model of functional differentiation instead models group agency as distributed and to whatever extent contingent. It questions taken for granted ideas of coherence and control and provides a critical view of the dynamics of collective agency in the face of growing complexity. By deepening our understanding of social systems this theoretical framework also allows for a consideration of the problems of governance and coordination in contemporary society (Moeller 2011).

### 3.4. Theoretical Foundations of Collective Decision-Making Systems

To understand the mechanisms behind collective decision-making, the most important theoretical contributions must be synthesized to study how institutional frameworks, such as the Borda and Condorcet voting rules, conform to or vary from basic social theories. In forging a relationship between Niklas Luhmann's theory of functional differentiation and John Searle's theory of collective intentionality I hold that it offers some valuable insights into the design and application of decision-making systems. They clarify the interaction between individual agency and structured processes and the advantages as well as disadvantages of collective frameworks for representing group preferences (Verweij et al., 2015).

During this work John Searle focuses on the fact that collective intentionality is shaping the institutional reality. Searle argues that collective intentionality allows human groups ascribe functions to objects and people which transcend their physical properties. Via this assignment, mediated through language, which functions as the bearer of 'status functions', institutional facts such as authority, ownership and governance are established. In any case, Searle's theory emphasizes that shared recognition, and deontic powers—rights, duties and obligations—are what hold the social system together. The concept of structured decision-

making frameworks, like Borda and Condorcet, echo the same principles in which the legitimacy and functional coherence of rules and procedures, as applied to the rule, are agreed upon collectively (Searle, 2010).

Chosen as the case study are the scoring rules of the Borda method, which realize Searle's principles of collective intentionality. The dependence of outcomes on shared recognition of the method's validity is demonstrated by the process through which each voter's ranking contributed to a cumulative score reflecting the collective preference. Like the Condorcet method, which depends on pairwise comparisons, is that concept of collective agreement; the winner is chosen by the majority's preference. Yet these frameworks also, like Searle's, reveal the problems with them — chiefly, the danger of manipulation, or of misalignment among individual and collective rationality. The tension between individual strategies and collective outcomes, the emphasis on tactical voting in the Borda system and the paradoxical cycles in Condorcet (Searle 2010; Moeller 2011), are exhibited there.

The analysis of group agency is additionally complicated by Niklas Luhmann's concept of functional differentiation. Modern societies are differentiated subsystems according to Luhmann which are autonomous, and each posit its own logic and boundaries. The result of this fragmentation increases the efficiency and specialization but makes coordination of collective action harder. These complexities in turn impact decision-making frameworks, such as Borda and Condorcet, which often take place in a setting where the subsystem priorities conflict with, and through, preferences and outcomes (Hwang & Lin, 2012).

Luhmann's point of critique against coherent group decisions is that collective preferences may not be aggregated smoothly. He proves that the systemic boundaries and communication barriers of decision processes limit the insights arising to the range of individual intentions represented by the outcomes. Take Condorcet's method as an example, a method prone to cyclical preferences and therefore difficult in heterogeneous groups to obtain consensus. Just as in the case of the Borda method, its susceptibility to strategic manipulation imitates how subsystem dynamics affect collective rationality.

While there are surely difficulties involved in this process of synthesis, the synthesis of Searle's and Luhmann's theories shows the promise of structured decision-making systems to manage group agency. The two frameworks integrate principles of collective

intentionality and functional differentiation, but they are also able to resolve the tension between individual autonomy and collective coherence. As an example, we demonstrate that iterative adaptations of the Condorcet method, which revisit preferences over time, are in line with Luhmann's theory of dynamic systems and evolving contexts. In addition, the inclusiveness and wider representation requirement of the Borda method is analogous to that of Searle's shared recognition and deontic powers (Laughlin, 2011).

We demonstrate applications of these frameworks to areas of real-world decision making using both macro and financial systems. Due to the ability of the Borda method to capture subtle preferences, it is capable to be used in the setting of corporate governance, where diverging stakeholder preferences should be weighed. However, because the Condorcet method prioritizes majority rule (which fits well with the democratic principles which underlay public policy decisions such as national referenda), the Condorcet method is a very interesting model to use. Searle and Luhmann's limitations—at least as identified—are susceptibility to manipulation and inherent constraints in the requirements of systemic differentiation, but the need for ongoing adaptations and refinements of these frameworks persists.

Finally, we bridge and build upon the insights from Searle's theory of social ontology and Luhmann's systems theory to offer a robust theoretical foundation for understanding and improving collective decision-making systems. This synthesis further develops how structured frameworks, such as Borda and Condorcet, enable the development of coherent and legitimate co decided decisions by examining the embodied interplay between individual agency, systemic constraints, and shared intentionality. Thus, by progressively elaborating to condition for the intricacies of contemporary societies, these frameworks restate the classic worth of essential public hypotheses to the practice of choice making (Searle, 2010; Moeller, 2011).

## 4. Conclusions, Limitations and Future Research

### 4.1. Conclusions

In particular, the Borda and Condorcet methods are analyzed in financial or macroeconomic decision making and their abilities to aggregate preferences and to render coherent decisions are exposed. This study clarified each of these methods' relative strengths and weaknesses, examined their theoretical foundations, their mechanics, and their appropriateness in these complex decision environments. With its focus on inclusivity and giving proportional representation to ideas, the Borda Count strongly reflects that it is able to balance many kinds of preferences. This capacity is particularly clear in situations where decisions rest upon the synthesis of dissimilar and frequently conflicting stakeholder priorities. The Borda method removes this problem by instead assigning points based on rank so even lower ranked preferences influence the final outcome. It is a robust tool for areas like corporate governance, in which board members (or stakeholders) have diverse priorities, and where board decisions regarding investment strategy or resource allocation, for example, need to be aligned to these varied priorities. Inclusivity in the method of participation helps build trust and transparency in what is known and unseen so that final outcomes emerge collectively in consensus with the collective goals. But the Borda Count is susceptible to strategic voting, a situation where the participants try to influence the ranking by doing strategically something; something that is unethical in an important or competitive situation. However, while this limitation constrains its use in some applications, its resilience against combinations of ambiguous or uncertain preferences has been strengthened by modern adaptations, including the addition of fuzzy logic; this has allowed it to be utilized in other areas of application such as risk assessment and environmental planning. On the whole, the Borda Count is used because it creates an inclusive aggregation of preferences and does so in a way that is balanced (suitable for contexts where a balanced approach is desired). Alternatively, the Condorcet method acts based on majority rule in pairwise comparisons, and the chosen option enjoys the most direct support over any other alternative. This is especially so for decisions requiring unequivocal majority, e.g., national referendum, policy reform, regulatory decision. The method's focus on majority preference fits with democratic principles and lends legitimacy

as well as stability to its outputs. Additionally, its robustness to strategic manipulation makes such an approach ideal for high stakes decision making in which the integrity of the process is so important. However, the Condorcet method is faulty. The example of the Condorcet Paradox, where cyclical preferences mean you won't necessarily get a clear winner, is a good illustration of how hard it is to aggregate preferences in heterogeneous groups. This issue is addressed by iterative adaptations of the method which stabilize preference over time allowing decision makers to reconvene and refine choices as stakeholder priorities alter. However, the method's dependence on majority rule limits its applicability in settings where minority preferences are to be better represented.

A comparative analysis is made showing that the decision between the Borda and Condorcet methods depends on the specific requirements of the decision-making context. Borda count is preferred when there is a need to come across a consensus by compromising diverse priorities. Applicable in corporate governance, it shows how it balances tradeoffs between competing objectives as risk, return, and strategic alignment. And, unlike the Condorcet method that emphasizes on majority support and thus makes sense for macroeconomic decisions like fiscal policies or national referenda that require robust popular backing.

These methods contribute in a meaningful way to the domain of financial and macroeconomic decision-making, among other areas, by offering structured frameworks for aggregation of preferences. The relevance of social choice theory to the complexities of modern decision environments is illustrated through their applications. The Borda Count and Condorcet method are complementary approaches to resolving the tradeoffs of collective decision making, balancing representative and legitimate outcomes.

The Borda and Condorcet methods provide access to distinct, yet complementary, tools of aggregating preferences in situations of complex decision making. And choosing the right method between the two would depend upon the context and the objectives of the decision. Such expansions in methods can be leveraged by decision makers to increase transparency, inclusiveness and legitimacy of outcomes, increasing trust and stability in financial and macroeconomic spheres. This analysis thereby justifies the enduring relevance of social

choice theory as well as the ways social choice theory can be used to judge the diversity of the problems faced in collective decision.

### 4.2. Limitations and Suggestions for Future Research

This study represents an important contribution to the applications of the Borda and Condorcet methods in financial and macroeconomic decision making, but this is not without limitations. A major limitation is that the methodology depends on a literature review, and hence the analysis is limited to the studies as well as theoretical frameworks available in the literature. However, this dependence compromises our ability to test the practical applicability, as well as the performance of these methods for real-world decision-making problems. Moreover, the analysis does not address contextual differences including variation in cultural, institutional or technological factors that may disrupt the effectiveness of these voting methods in different contexts. Consequently, the results may not be of general application and must be understood in the light of these contextual caveats.

The second limitation is the theoretical rather than empirical validation. The theoretical advantages and disadvantages of Borda and Condorcet are well explicated, but no empirical case studies or quantitative analyses are provided to ground their effectiveness as methods of decision in practice. Moreover, the study does not assess the extent to which these methods, or combinations of them, can be combined with hybrid or alternative approaches to decision making, offering superior, fine grained solutions to preference aggregation problems.

To overcome these limitations, future research should focus on empirical studies that tend to test, under which conditions and in which specific financial and macroeconomic settings, the Borda and Condorcet methods can be practically implemented. Finally, the way the methods perform under different conditions and stakeholder configurations can be explored through such studies via, for example, simulations, experimental designs, or real-world applications. In addition, the ability to study how these methods can be fused with newer technologies, like artificial intelligence and machine learning, to navigate these hurdles will offer new ways to cope with limitations of preference aggregation. Comparative analysis of hybrid frameworks comprised of Borda and Condorcet components could also enrich our understanding of how to choose in the complex world.

Extending the range of research to include such dimensions provides more utility to social choice theory as a framework for addressing contemporary decision-making challenges.

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