

Article

Analysis of Dance Data Company Endowments, Assets, and Labor in the United States

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¹ **Abstract:** To understand how we can advance equity in dance, it is crucial to understand existing financial structures and incentives that shape these companies' success. Assessment of publicly available tax documents on dance companies over the past decade can provide important insights into how different companies fared financially over this time period. Additionally, this work can provide an important basis of understanding for future analyses on the impact of the pandemic on existing trends on the financial performance. By analyzing publicly available Form 990 documents on 169 dance companies across the United States, we present information on companies' endowments, investments, compensation of employees, and sources of labor. In the process, we also bring light to issues of data quality to consider when analyzing Form 990 documents.

¹⁰ **Keywords:** Endowment; Non-Profit; Volunteer Labor; Dance.

¹¹ **1. Introduction**

¹² **1.1. Scope**

¹³ As a matter of transparency and public accountability, tax documents filed by nonprofit corporations in the United States have always theoretically been available to the public, but it wasn't until the development of electronic tax filing systems through the IRS that these tax documents became easily accessible for analysis. Online tax filing systems have been available since the late 1990's, but the 2019 Taxpayer First Act required all nonprofits to electronically file their tax returns [1]. This legislation changed the landscape for public accessibility of the financial information of nonprofits as well as presented novel research opportunities for data activism. Incorrect reporting, inequitable wealth distribution, and tax fraud by nonprofit organizations has always happened, but mandatory online reporting allows data analysts to identify suspected cases and draw attention to them [1].

²² **1.2. Inequality in the Arts**

²³ Financial discrepancies by nonprofits commonly impact those already at social and economic disadvantage, such as women and girls. The study of women and gender has consistently drawn focus to inequitable distribution of wealth between men and women. One of the most heavily researched phenomena regarding wealth inequality is the wage gap between men and women that persists even when they have the same education, experience, skills, and job titles [2]. Contrary to the popular opinion that the gender wage gap is narrowing, Weichselbaumer & Winter-Ebmer [3] showed that financial returns in relation to skills and education are increasingly higher for men than for women. Even less research has been done on the wage gap for transgender or non-binary individuals. Additionally, compounding factors such as lack of corporate oversight and socially-imposed gender roles further entrench the gender pay gap into everyday life [4]. Further understanding the wage gap

³³ in female-dominated fields, such as in dance, can inform future solutions to lessen the inequitable
³⁴ distribution of wealth between men and women.

³⁵ The wage gap has long been exacerbated by disproportionate pay in the arts, and especially
³⁶ dance, in part because the vast majority of entry-level dancers are women and girls [2]. Additionally,
³⁷ unpaid labor in dance is much more commonplace than in other industries [4]. Because dance is a
³⁸ performing art, many companies that employ dancers are entitled to government subsidies and tax
³⁹ breaks; however, there are no current regulations to ensure that this governmental assistance is used
⁴⁰ to lessen unpaid and underpaid labor by dancers [5]. Unrestricted financial assistance may worsen
⁴¹ existing inequalities in the field of dance by enabling company owners and executives to profit while
⁴² retaining unpaid and underpaid labor, so further understanding how this assistance is used is essential
⁴³ in combating the problem.

⁴⁴ 1.3. *Dance and Tax Returns*

⁴⁵ In the United States, nonprofit organizations file either a Form 900 or a Form 990 EZ with the
⁴⁶ IRS each year. These documents include, but are not limited to, information on the organization's
⁴⁷ geographic location, number of employees and volunteers, operating costs, income, compensation,
⁴⁸ and net assets. Additionally, some nonprofits are required to fill out Schedule D forms alongside their
⁴⁹ 990 filings if they have certain additional assets. This information is more accessible than ever now
⁵⁰ that the government has required nonprofit organizations to electronically file them. Yet, much of the
⁵¹ public does not understand the terms on publicly available tax forms nor does the average person
⁵² possess the skills to readily analyze hundreds of tax forms every year [6]. Thus, data scientists can
⁵³ play a very important role in analyzing these forms filed by dance companies and presenting findings
⁵⁴ to the public. Further elucidating the financial practices of nonprofit organizations 1) in the field of
⁵⁵ dance, 2) in pandemic-related economic shifts and 3) through geographical analysis can help inform
⁵⁶ proper solutions to a wide range of issues, including the gender pay gap in dance.

⁵⁷ 1.4. *The Dance Data Project*

⁵⁸ We completed this project in collaboration with our project sponsor, the Dance Data Project ®
⁵⁹ (also known as the DDP ®). The Dance Data Project® is a non-profit organization dedicated to equality
⁶⁰ in the arts. Founded in 2015 by former ballet dancer and philanthropist Elizabeth Yntema, the DDP ®
⁶¹ uses data and research to promote transparency, accountability, and action towards gender equality in
⁶² dance.

⁶³ The DDP ® collects, analyzes, and presents data to outline lack of leadership opportunities for
⁶⁴ female directors, choreographers, composers, set, costume, lighting designers, and back-of-house
⁶⁵ positions in dance. The organization seeks to create a world where all dancers, regardless of gender,
⁶⁶ race, ethnicity, or socioeconomic status, have equal access to opportunities and resources in the
⁶⁷ dance world. The organization also advocates for removing barriers for female employment and
⁶⁸ advancement in this industry, such as lack of parental and elder leave, day care system, and protocol
⁶⁹ for sexual harassment by presenting their findings on television news such as MSNBC and publishing
⁷⁰ articles in magazines such as *Vogue* and *People*. Through its data-driven research, advocacy, and
⁷¹ education efforts, the DDP ® works to create a more equitable and inclusive dance community where
⁷² all individuals have the opportunity to pursue their passion for dance.

⁷³ 1.5. *Current Study*

⁷⁴ This project was a preliminary analysis of publicly available financial information on dance
⁷⁵ companies in the United States. Results were collected for and shared with Dance Data Project ®
⁷⁶ for any publications or future analyses that they perform. Because little analysis has been done on
⁷⁷ financial practices of dance companies in the United States, our exploratory approach examined broad
⁷⁸ research areas regarding how dance companies manage endowments, employment, and properties.

79 The bulk of our report consists of examining how companies' financial resources (particularly
 80 endowments) behave over time, in comparison to one another, and in comparison to the S&P 500.
 81 We also look into the use of volunteer labor alongside the use of paid employment labor and how
 82 geographical location impacts the use of each type of labor.

83 The data source for this project is a collection of IRS Form 990's and IRS Form 990 EZ's from dance
 84 companies in the United States. These publicly available tax documents are required annual filings for
 85 nonprofits¹ and include information such as the number of employees and volunteers, compensation
 86 to employees, geographical location, and annual revenue. As part of the Form 990's, companies with
 87 certain financial assets must report Schedule D forms, which contain data on endowment funds as
 88 well as building values and other assets. We primarily present analysis based on Schedule D of the
 89 Form 990. Our analysis seeks to capture trends in how these companies have managed their assets and
 90 endowments, primarily in the time span of 2014 to 2020, with the goal of bringing transparency to the
 91 financial side of the dance industry.

92 **2. Ethics Statement**

93 This project included signing a non-disclosure agreement with Dance Data Project ® in which
 94 each group member agreed to keep specific collections of data produced by DDP ® confidential. Still,
 95 data that was collected during our analyses was not covered by the NDA but was still sensitive. The
 96 potential impact of this information getting into the wrong hands would be harmful to the Dance
 97 Data Project ® and their ability to publish the findings. Certain information could be used by dance
 98 companies to silence the DDP's ® message or competitors could publish and get recognition for DDP's
 99 ® proprietary information. Therefore, each team member was especially careful not to disclose any
 100 information that may harm DDP's ® work to third parties.

101 We also assumed that data reported on the IRS 990, 990EZ, and Schedule D forms was accurate
 102 unless identifiable discrepancies were found or amendments were reported. The social harm that could
 103 occur from this assumption is dance companies who accidentally misreport on their tax documents
 104 may be identified in our analyses as violating ethical or financial norms. In order to prevent this, our
 105 team and DDP ® collaborated to reach out to companies to ask for clarification of our findings before
 106 potentially publishing their name.

107 Finally, all of us have training in data science, but we are not dancers. Because none of us have
 108 lived experience in dance, we cannot provide personal expertise in analyzing this data. Additionally,
 109 our group all identifies as female and we have limited racial diversity and no input from the Black
 110 community. The standpoints of dancers, men, and people of diverse backgrounds in data analyses may
 111 offer a more comprehensive understanding of the context behind our dataset. In order to reduce our
 112 bias (although it was not possible to change our social identities), we spoke with our project sponsors
 113 about how to approach this data that may impact other social groups.

114 **3. Detailed Methodology**

115 ***3.1. Data Acquisition***

116 Data files were gathered by Andrew Hoekstra, data consultant from DDP ® , prior to February
 117 8th, 2022 from publicly available IRS APIs. Form 990s were downloaded as XMLs. Our sample
 118 contained 169 US dance companies in total, with Form 990s submitted between 2015 and 2022, thus
 119 representing fiscal years 2014 through 2021. For Schedule D in particular, companies are required to
 120 report endowment totals up to 4 fiscal years prior, thus our endowment data spans 2010 to 2021.

¹ Most major dance companies are nonprofits.

121 *3.2. Initial Wrangling & Filtering*

122 Form 990 can be completed in three different formats: Form 990, Form 900-EZ, and Form 990-T.
 123 We excluded all Form 990-Ts because these forms do not contain relevant information on variables
 124 considered in our analyses. Additionally, when a company amended a filing, and hence had multiple
 125 filings corresponding to a single fiscal year, we took the amended filing.

126 *3.3. Quality Assurance*

127 Because in a single filing, a company reports years for several endowment variables not only for
 128 the current year but for the prior year, two years back, three years back, and four years back, we can
 129 check if filings across years are concordant.

130 For example, when a company reports in their 2020 filing the beginning of year endowment
 131 balance for years 2016 through 2020, we can check whether the value they reported for 2016 in the
 132 2020 filing (in the four years back column) was indeed what they reported in 2016 (in the current
 133 year column). Reporting was highly consistent across the companies considered; however, there were
 134 some notable discrepancies, particularly in earlier years. When we identified these discrepancies, we
 135 reached out to the companies to clarify which values were correct. We received prompt responses from
 136 BalletMet and Pittsburgh Ballet, who confirmed the more recently reported values were correct (Table
 137 1).

138 Because discrepancies were typically in earlier years, and our communications with the companies
 139 who did respond noted their most recently reported values were correct, in our analyses we took the
 140 most recent data available. For example, we took values for 2016-2020 from the 2020 filing instead of
 141 taking the current year values for the filing from each year separately.

142 Another result of this approach is that we can look back through 2010 in some cases, since
 143 although we only have filings that go back to 2014, each filing has data going back four years.

144 *3.4. Standard Definitions*

145 Before going into our findings, below we provide a set of standard definitions on fundamental
 146 concepts we use throughout our analyses.

Term	Definition
Endowment	The form 990 uses the definition of the endowment (and types of endowments) from the Financial Accounting Standards Board , which defines an endowment fund as “An established fund of cash, securities, or other assets to provide income for the maintenance of a not-for-profit entity (NFP). The use of the assets of the fund may be with or without donor-imposed restrictions.”
Rank	When ranking by a numeric variable, we defined the rank of 1 to be the highest rank among all companies, with subsequent ranks indicating a lower rank relative to other companies. When two companies had identical rankings, their ranking was taken as the average was taken. For example, the ranking of (1,2,3) would be (1,2.5,2.5). In this work, the precise values of the rankings are less relevant than their orderings.
Percent Change	The percent change is $\frac{\text{End Value} - \text{Beginning Value}}{\text{Beginning Value}} \times 100$.

Term	Definition
S&P 500	The Standard and Poor's 500 Index is a standard index used as a benchmark to describe the behavior of the stock market overall. The index includes 500 top publicly traded companies and is weighted by the market value of stocks currently held by stakeholders, where companies with higher market value receive higher weight.
Compound Annual Growth Rate	The compound growth rate (CAGR) describes a company's average growth over multiple years. It is useful as a smoothed metric to look over growth over a set of years and compare companies in the same time period. For a time period of t years, we compute the annual growth rate as $\text{Compound Annual Growth Rate} = \left(\frac{\text{End Value}}{\text{Beginning Value}} \right)^{\frac{1}{\text{End Year} - \text{Beginning Year}}} - 1.$

147 4. Findings

148 4.1. Endowments

149 **Endowments** are donated funds to nonprofit organizations which are invested. Endowments are
 150 typically designed to maintain initial donations (principal funds); the investment income produced by
 151 the invested donation can be utilized for specific purposes. Depending on endowment management
 152 and policies, some organizations can remove a certain amount of principal assets from their endowment
 153 per year.

154 4.1.1. Types of Endowments

155 There are **three categories** of endowment funds as defined by the IRS.

- 156 • **Term endowments** (temporarily restricted endowments) are funds that are donor-restricted,
 157 which means they are meant to be used for a certain amount of time or until a particular event.
- 158 • **Permanent endowments** are endowment funds from donor-restricted gifts where the initial
 159 fund must be invested; however gains or losses from these investments can be used by the
 160 organization.
- 161 • **Board-designated or quasi-endowment** are funds that were internally designated for specific
 162 use but are not donor-restricted. Investment gains and losses are typically utilized; however, the
 163 principal funds can be expended at any time.

164 Most dance companies have their endowment funds primarily in the permanent endowment
 165 category, whereas the proportion held as a board designated/quasi-endowment is typically less than
 166 25%, as is the proportion held as a temporarily restricted endowment (1). For the majority of companies,
 167 the proportions held in each category are fairly consistent across the years. In fact, some companies
 168 held their endowment in a single category across all years on file (Table 3).

Table 1. Companies Reached Out to Regarding Discrepancies

Company	Discrepancy
Aspen Santa Fe	The current year value for other expenditures for fiscal year 2018 is \$6,906,449, but in 2019 the prior year value for other expenditures is \$6,356,449 and, in accordance with the 2019 report, in 2020 the two years back value is \$6,356,449.
BalletMet	In 2015, the current year beginning of year balance is reported as \$262,509, but then in 2016, the prior year beginning year balance is said to be \$235,225; future year filings are in accordance with the \$235,225 value.
Ballet Arizona	In the 2016 and 2017 filings, the beginning of year balance corresponding to fiscal years 2016 and 2017 were reported as \$101,399. However, in the 2018 filing the value for 2016 was reported to be \$601,399, and the value corresponding to 2017 was reported as \$4,126,424.
The Alabama Ballet	In the filings for fiscal years 2016, 2017, and 2018, the beginning and end of year balances are marked as \$250,000 for all included years. However, in 2019, the value reported for the prior year (2018) is \$477,040, and in the filing for fiscal year 2020, the values are not concordant with the \$250,000 value.
Fort Wayne Ballet	In the 2017 filing, the beginning of year balance is \$1,264,981. However, in the 2018 filing, the beginning of year balance for the prior year is reported as \$1,291,109 (second image below, and then the 2019 and 2020 filings both report the value corresponding to 2017 as \$1,413,780. There are similar discrepancies for the end of year balances.
Joffrey Ballet	First, in the filing for the 2015 fiscal year, the value corresponding to 2015 is \$1,443,297, and the value corresponding to the 2014 filing is recorded as \$170,360. However, in 2016, the value corresponding to 2015 is reported as \$1,136,139, and the value for 2014 is reported as \$35,600. Additionally, the reported contributions amount (under Part V: endowment funds) for the filing on fiscal year 2016 is \$236,579, but in 2017 the contributions amount reported for the prior year (2016) is \$278,281; the value of \$278,281 is reported in following years.
The San Francisco Ballet	In San the tax filings corresponding to fiscal year 2015, the beginning of year balance for 2013, 2014, and 2015 are reported as \$174. These values are in accordance with the fiscal year 2016 filing, and the beginning of year balance for 2016 is also reported as \$174. However, in the filing for the 2017 fiscal year, the reported beginning of year balance for the prior year (2016) was \$107,033,575, for two years back (2015) it was 105,867,946, for three years back (2014) it was 92,513,161, and for four years back (2013) it was \$79,137,681.
Pittsburgh Ballet Theatre	In the filing for fiscal year 2018, the current year net investment earnings/losses/gains is \$475,508, but in the filing for fiscal year 2019, the value \$556,273 is reported for the prior year (2018), and in the 2020 filing again we see the value \$556,273 for 2 years back (2018). Also, in the filing corresponding to fiscal year 2020, the reported investment earnings/losses/gains is \$147,166, but in the 2021 filing the prior year value is reported as \$172,248.

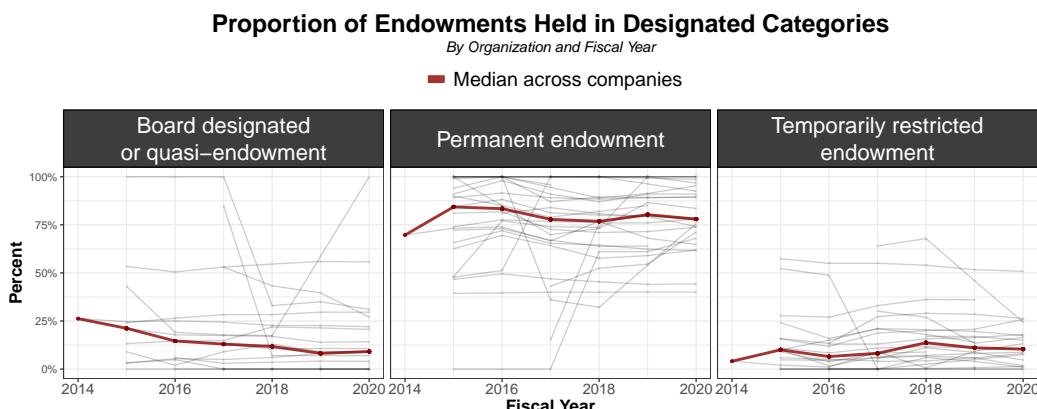
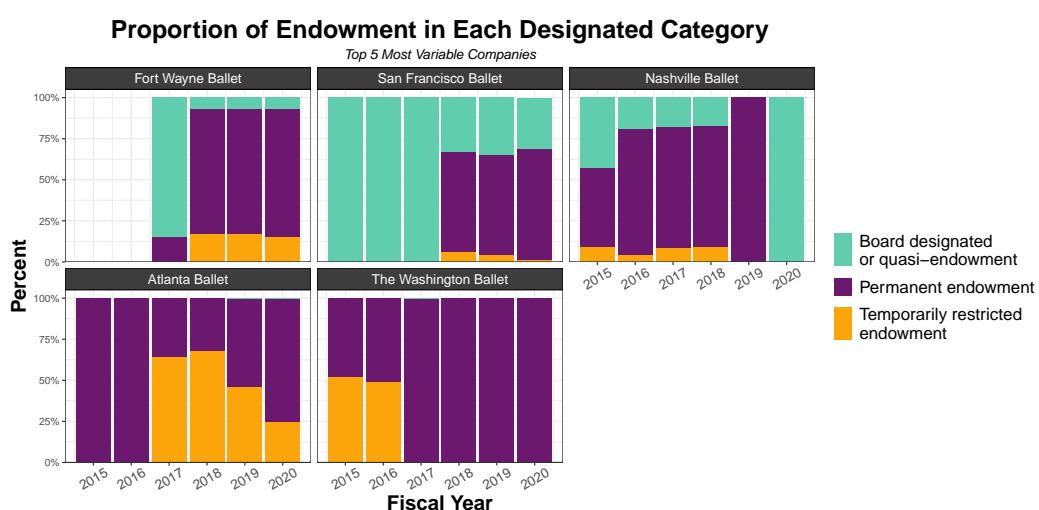
**Figure 1.** The percent of endowments held as a temporarily restricted endowment, permanent endowment, or board designated or quasi-endowment. The median across all companies by fiscal year is shown in red.

Table 3. Organizations with 100% of their Endowments in One Category for All Years on File

Organization Name	Number of Years on File
Board designated or quasi-endowment	
The Tallahassee Ballet	6
Ballet Quad Cities	2
Canyon Concert Ballet	1
Permanent endowment	
Pittsburgh Ballet Theatre	7
Dance Theatre of Harlem, Madison Ballet	6
BalletMet	5
Aspen Santa Fe Ballet, Ballet West	4
New Mexico Ballet Company	3
Oregon Ballet Theatre	2
American Repertory Ballet, Colorado Ballet, Orlando Ballet	1
Temporarily restricted endowment	
First State Ballet Theatre	6
Ballet Des Moines	2

169 However, there are several notable exceptions to the general trend of consistency across years.
 170 Defining variability as the maximum standard deviation of the proportions for each category, the most
 171 variable 5 companies were Fort Wayne Ballet, San Francisco Ballet, Nashville Ballet, Atlanta Ballet, and
 172 the Washington Ballet (Figure 2).

- 173 • For Fort Wayne Ballet, most of the endowment funds (86
 174 100
 175 • The trends in Nashville Ballet's endowment went the opposite direction, with a large increase in
 176 the percentage in the board designated/quasi-endowment category (17
 177 • For Atlanta Ballet, there is a dramatic shift in 2017 where the percentage held as temporarily
 178 restricted goes from 0
 179 • The Washington Ballet had a high proportion of its endowment in the temporarily restricted
 180 category (52

**Figure 2.** Proportions of endowments in each designated category over time for the 5 companies with the most variability. We defined the most variable companies by considering the maximum standard deviation in the proportion in any one category.

¹⁸¹ 4.1.2. Which Companies Have Endowments?

¹⁸² As we discuss these endowment analyses, one of the most fundamental questions about
¹⁸³ endowments is how many companies report them, and how that varies over time. To report
¹⁸⁴ endowments, nonprofits fill out Schedule D in Form 990. Out of 169 dance companies we investigated,
¹⁸⁵ 47 reported endowments at least once in Schedule D (Table 4).

Table 4. Number of Companies that Reported an Endowment

	Reported an Endowment	Did Not Report an Endowment
By Year		
2014	6	1
2015	70	35
2016	79	37
2017	83	42
2018	96	40
2019	106	40
2020	83	40
2021	21	6
Reported an Endowment at Least Once		
	122	47

¹⁸⁶ 4.1.3. Consistency of Endowment Reporting

¹⁸⁷ In investigating frequency of reporting endowments, we can see that most companies who report
¹⁸⁸ an endowment continue to consistently do so across their 990 filings (Figure 3). Some, however,
¹⁸⁹ including Oregon Ballet Theater and Ballet Des Moines, begin reporting an endowment well after
¹⁹⁰ their first filed 990. Other companies such as The Charleston Ballet, Colorado Ballet, and American
¹⁹¹ Repertory Ballet stop reporting endowments.

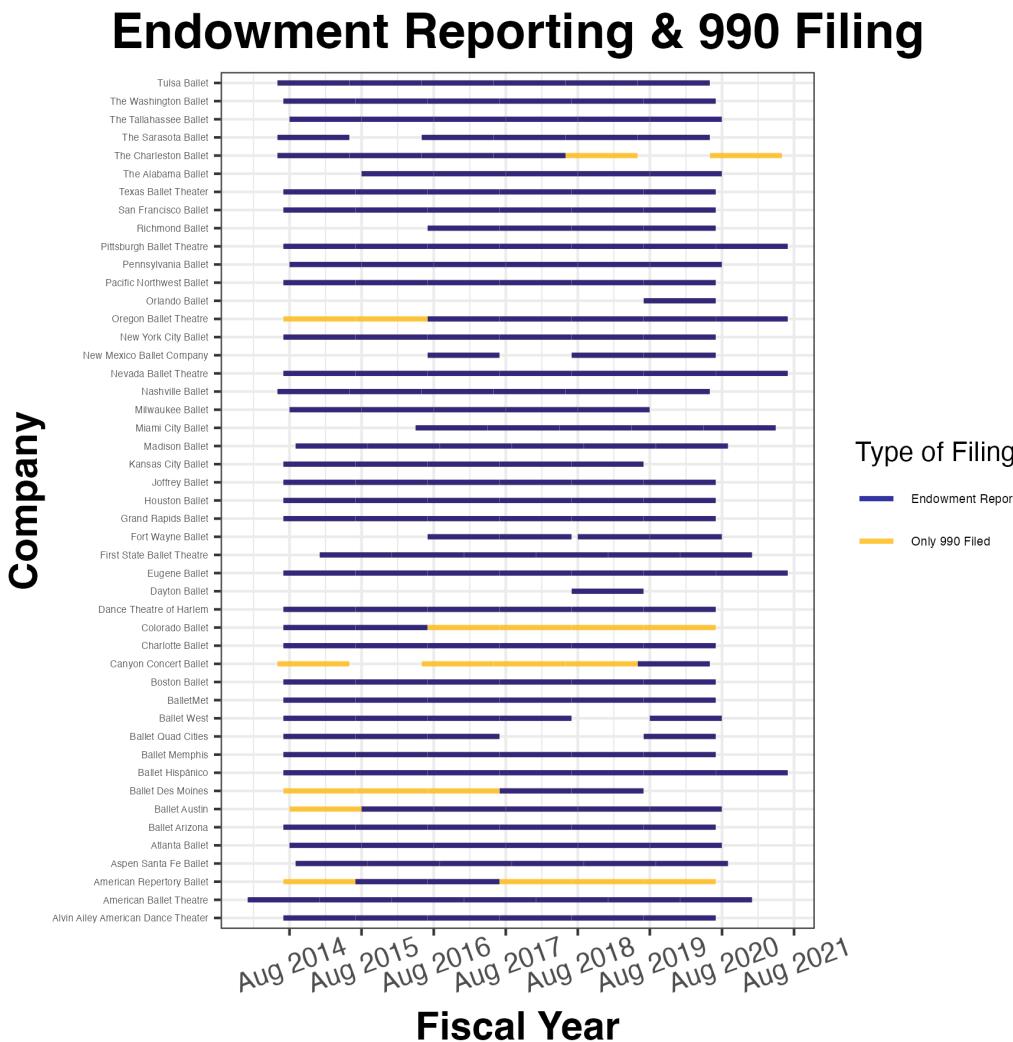


Figure 3. Continuity of filings among dance companies; gaps in a companies' filings correspond to missing fiscal years.

4.1.4. Ranking Companies' Endowments

Ranking companies can be useful to see how endowments did relative to each other rather than looking at the raw values, which are on immensely different scales.

When we look at the rankings of the beginning of year balance of companies' endowments, we see immediately that the top 7 companies, New York City Ballet, San Francisco Ballet, Houston Ballet, Alvin Ailey American Dance Theater, American Ballet Theatre, Pacific Northwest Ballet, and Boston Ballet, see no changes in ranking from 2013 to 2020 (Figure 4).

Below the top 7, there are more shifts in the rankings across time, with some companies changing dramatically in ranking. This includes:

- A dramatic decrease in Aspen Santa Fe Ballet's ranking from 2018 through 2020
- A marked increase in:
 - Joffrey Ballet's ranking
 - Orlando Ballet's ranking
 - Fort Wayne Ballet's ranking
 - Ballet Arizona's ranking
- A decrease in Atlanta Ballet's ranking from 2013 to 2015 that then recovered.

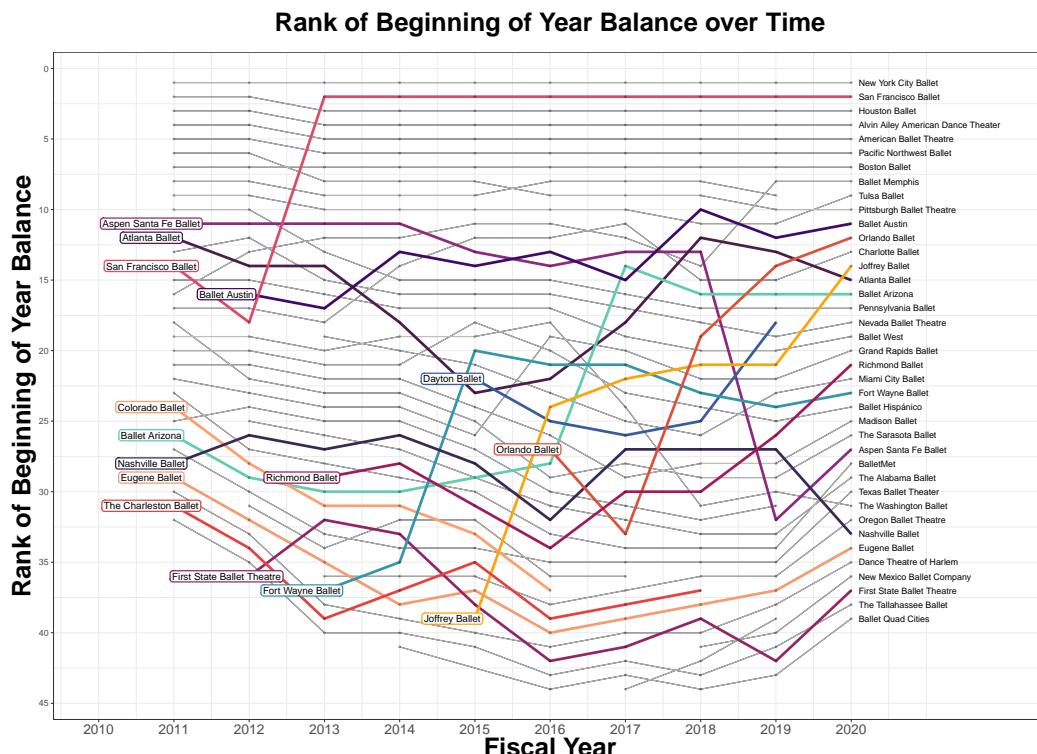


Figure 4. Rank of the endowment beginning of year balance over time. The 15 companies with the most variability in ranking, defined as the mean difference in rankings between fiscal years, are shown in color. Names of all companies are on the right.

When we add information on how these companies ranked in contributions (Figure 5), we see that although some organizations that are top ranked in endowment balance are also top ranked in mean contributions, several of the companies that experienced notable changes in their rankings also were ranked high in contributions, in particular, Orlando Ballet and Joffrey Ballet.

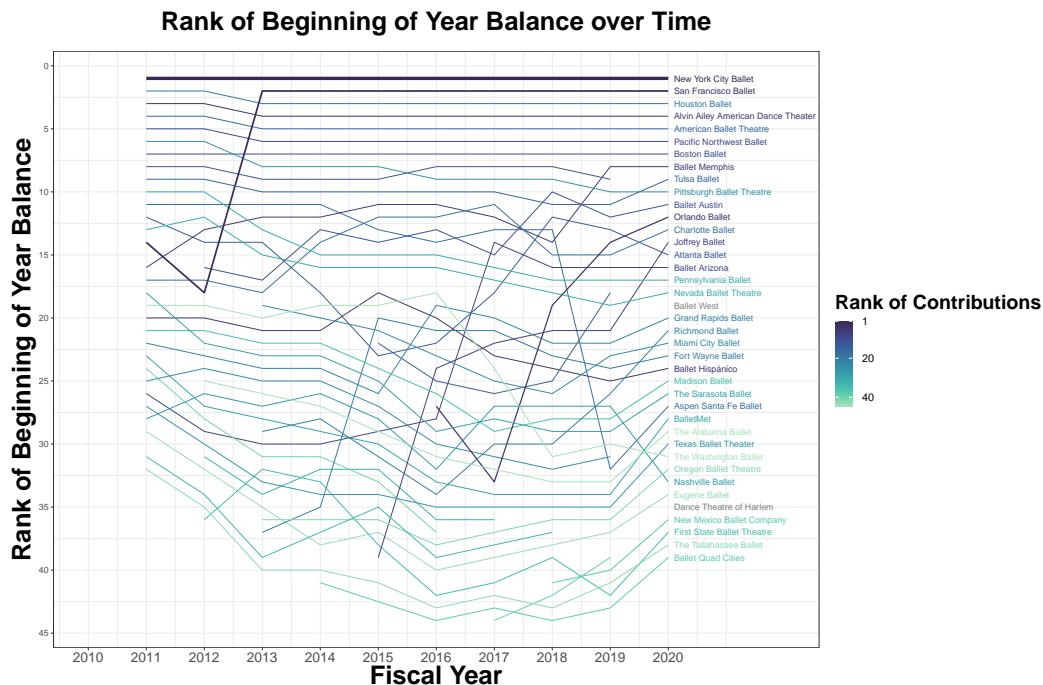


Figure 5. Rank of the endowment beginning of year balance over time, where the color indicates the ranking of the mean contributions received over all years on file for the company.

212 Looking more closely at the relationship between contribution rankings and beginning of year
 213 balance rankings, in Figure 6, there is a strong relationship between how a company ranks with regard
 214 to their contributions relative to the other companies and how a company ranks in the endowment
 215 beginning of year balance. That is, when companies are ranked high in the beginning of year balance,
 216 they tend to rank high in contributions as well. As we would expect, this trend holds across the full set
 217 of fiscal years considered.

218 However, the rankings are often not identical. If they were, all points would fall on the red line,
 219 which represents an exact correspondence between rankings. In some cases, a company consistently
 220 ranks higher in contributions relative to the beginning of year balance. We summarize whether the
 221 contributions or beginning of year balance tends to rank higher for a given company in Figure 7.
 222 For example, Ballet West ranked higher in the endowment beginning of year balance for each year
 223 available (2016-2020), while Nashville Ballet ranked higher in contributions than beginning of year
 224 balance for every year on file (2011 - 2022).

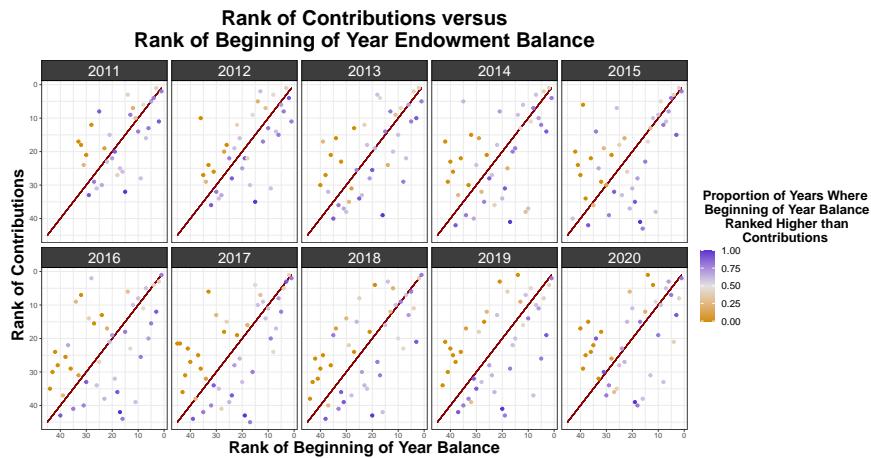


Figure 6. Comparing the rankings of beginning of year balance of the endowment to the ranking of contributions received.

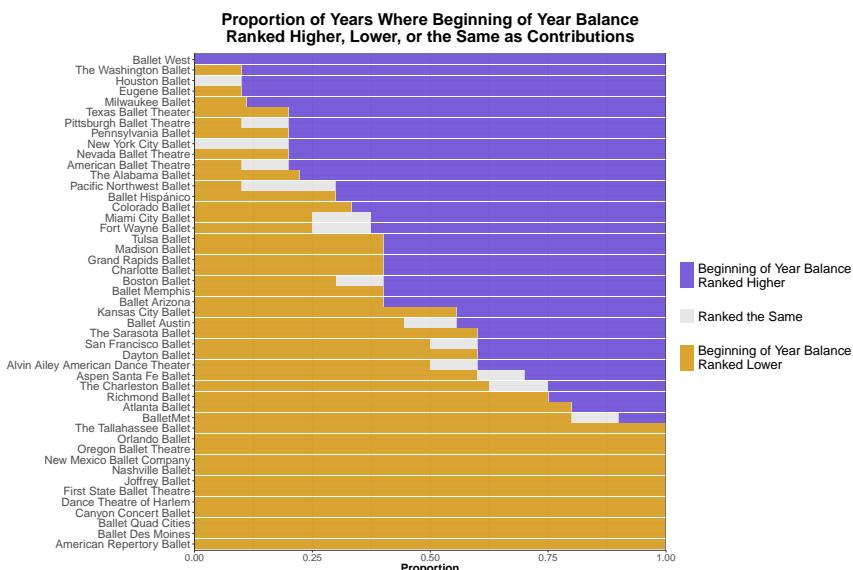


Figure 7. Comparing the proportion of years where a company ranked higher, lower, or the same in beginning of year balance compared to contributions received. A higher rank means a rank closer to 1, where 1 is the top possible rank.

225 In contrast to what we saw in the rankings of the beginning of year balance (Figures 5 and 4, we
226 see in Figure 8 that the rankings of contributions are much less consistent.

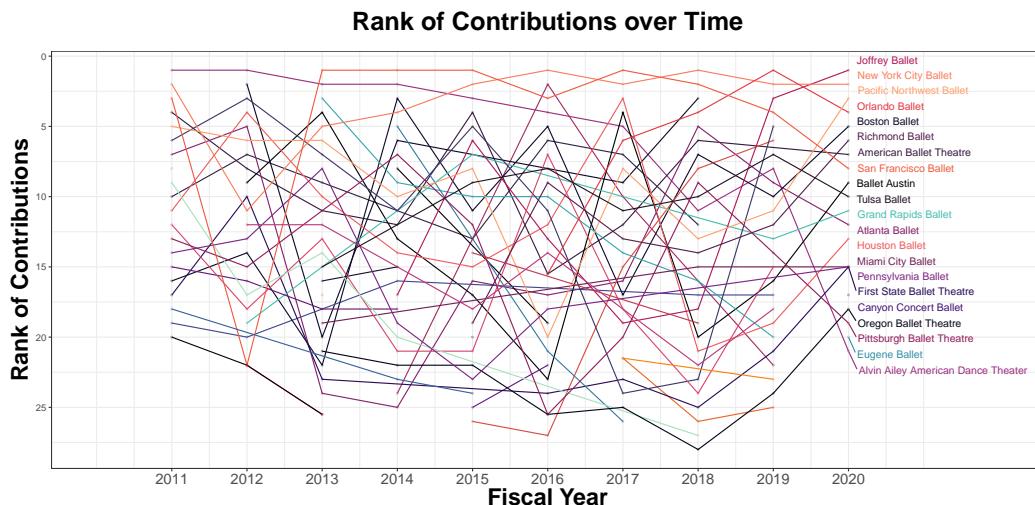


Figure 8. The rankings of contributions over time, by organization.

227 4.1.5. Reported Endowment Balances over time - Is the Math right?

228 Due to time constraints within our project, we did not have the opportunity to reach out to
 229 any companies regarding their miscalculations or negative expense reports. We hope to do
 230 this in the future, prior to this report being published.

231 Theoretically, one can calculate an endowment's fiscal year end balance based on all information
 232 provided in Schedule D. We calculated the end of year balance (see the equation below), and then
 233 compared our calculated balance to the reported end of year balance. The majority of calculations
 234 are concordant; however, we noted discrepancies in thirteen companies. Discrepancies range from
 235 \$-20,000 (Orlando Ballet, 2016) to \$8,301,066 (Atlanta Ballet, 2017). Due to the scaling of the below
 236 figure, differences in reported and calculated balance below a hundred thousand dollars are difficult
 237 to see.

$$\begin{aligned}
 238 \text{Calculated Year End Balance} &= \text{Beginning Year Balance} + \text{Contributions} + \\
 239 &\quad \text{Investment Earnings or Losses} - |\text{Administrative Expenditures}| - \\
 240 &\quad |\text{Other Expenditures}| - |\text{Grants or Scholarships}| \tag{1}
 \end{aligned}$$

240 For values related to expenses (administrative expenditures, other expenditures, grants or
 241 scholarships), we took the absolute value to ensure all were positive numbers. Four companies
 242 (Ballet Hispánico, Atlanta Ballet, Miami City Ballet, and Dance Theatre of Harlem) report their other
 243 expenditures as a negative value; thus, when calculating end year balance, subtracting a negative
 244 value would result in an additive, not subtractive, effect.

245 We see the difference in the extent of discrepancies when we take the absolute value (Figure 9 (a)),
 246 as in equation (1), versus when we do not (Figure 9 (b)). There are less discrepancies when we do take
 247 the absolute value.

248 Since we compute the difference by taking $\text{Reported End Balance} - \text{Calculated End Balance}$,
 249 negative values indicate the calculated end balance was larger than the reported, and positive values
 250 indicate the reported end balance was larger. The calculated differences are split between being
 251 negative or positive.

252 Atlanta Ballet has the largest discrepancy in (a); however, we see that if we don't take the absolute
 253 value and take the negatives as is (b), the values are concordant. The opposite issue occurs for Miami
 254 City Ballet, whereby in (a) with the absolute value, they are concordant. However, in (b) without
 255 absolute value of expenses, they appear eight times. Both of these situations stem from reports of

negative values in an expenses column, although they are mirrored situations. Thus, this raises the question as to how negative expenses should be dealt with.

Considering panel (a), most companies only miscalculate once; however, there are multiple miscalculations for Fort Wayne Ballet, Atlanta Ballet, and Ballet Arizona. Of note, some of these differences were trivial (e.g., \$10). Eugene Ballet does not report an end year balance for 2011, yet reports a beginning balance of \$45,000, hence the -\$45,000 difference we see for this year.

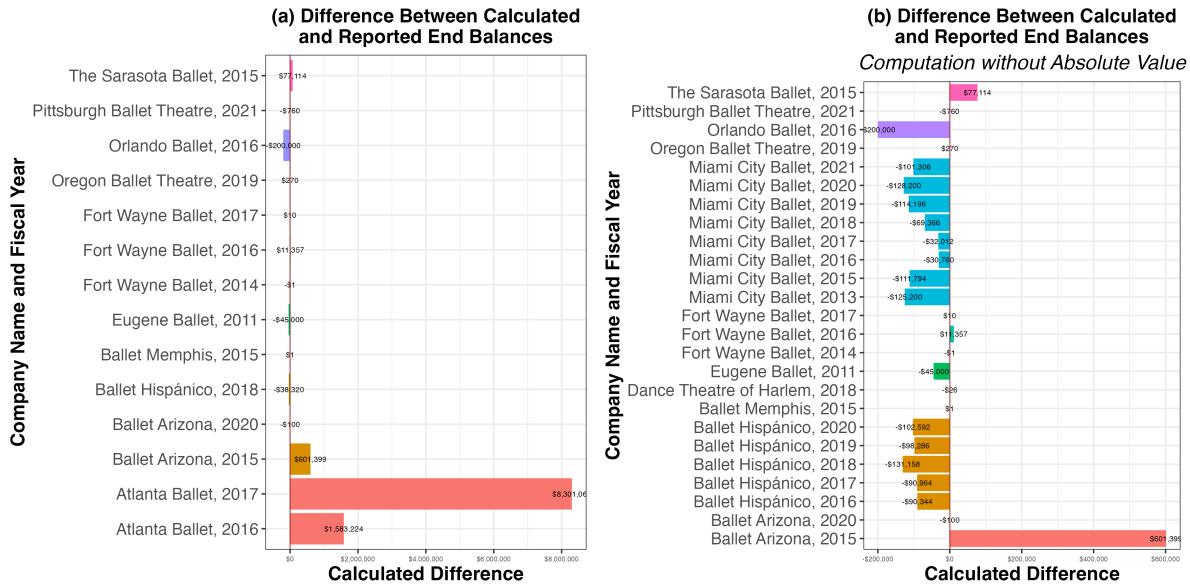


Figure 9. Comparing the reported end of year balance to that we computed based on other reported variables. Calculation is done with the absolute value in (a) and without in (b). Each organization is in a different color.

We summarize the discrepancies found by taking the absolute value (e.g. panel (a) of the above figure) in Figure 10. When taking the absolute value, the company who misreports the most is Fort Wayne Ballet with three miscalculations.

In future work involving end balance, we chose to utilize the reported end year balance, as we are still uncertain how to handle negative expenses. Thus, we could potentially be utilizing values which are incorrectly reported. End balance is involved in calculations for two examinations in particular: 4.1.5 with Annual Percent Change and 4.1.6 Compound Growth Rate. Any erroneous end year balances will thus produce inaccurate figures. Thus, for companies whereby an incongruence was identified (either with or without absolute value), we cannot be certain whether our calculated Compound Growth Rate or Annual Percent Change accurately reflect those companies' endowment growth or behavior.

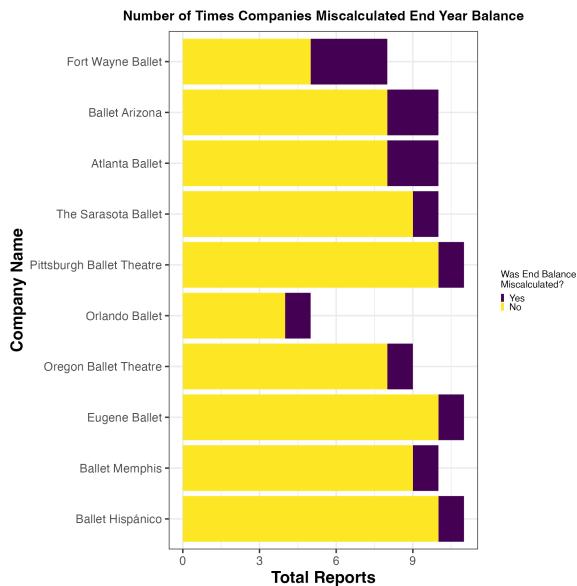


Figure 10. Number of observations where there was a discrepancy between the calculated and reported end of year balance, using the absolute value equation given in equation (1).

273 4.1.6. How Endowments Did Over Time

274 Annual percent change is the percent change from one value to the next at the end of a year-long
 275 period. With regard to endowment balances, the annual percent change in endowment balance is a
 276 comparison between the endowment at the beginning of the fiscal year and the endowment of the end
 277 of the fiscal year, which allows us to interpret by what percent the endowment has grown or shrunk.
 278 Charting percent change over time allows us to view endowment behavior over time; further, we can
 279 compare percent changes between companies to get a sense for trends in how different companies'
 280 endowments change.

281 To provide some context on the interpretation of percent change, we first state a couple of standard
 282 definitions.

283 The relative change, which represents how much a value has changed relative to its initial value,
 284 is

$$\text{Relative change} = \frac{\text{End Value} - \text{Start Value}}{\text{Start Value}}.$$

285 The effect of considering relative change means that we can more easily compare companies that
 286 have enormously different beginning of year balance sizes. For a company with a small endowment, a
 287 difference of 10,000 may be substantial, while the same difference would be minimal if the company
 288 has over a million in its endowment.

289 The percent change, which is the relative change in percentage form, is simply Relative Change \times
 290 100.

291 When we are considering the percent change within a fiscal year, that is, from the beginning of
 292 year balance to the end of year balance, a couple of examples of the interpretation include²:

- 293 • If the percent change is -50% , the endowment's value at the end of the fiscal year is half of what
 294 it was at the beginning.

293 ² For a relative change of value R , it can be more intuitive to interpret it by considering the expression $\text{End Value} = (R + 1) \times \text{Start Value}$. That is, if we have a relative change, we simply add 1 to it and multiply it by the starting value to acquire the end value.

- 295 • If the percent change is 100%, the endowment's value at the end of the fiscal year is twice that it
 296 was at the beginning.
 297 • If the percent change is -100% , the endowment's value dropped to zero throughout the fiscal
 298 year.
 299

300 We calculated each company's within-year percent change of endowment balance, as this allows
 301 us to compare the performance of different companies' endowments over time. A positive percent
 302 change indicates growth within the fiscal year; a negative percent change indicates loss.

303 The percent change of most companies falls between -100% and 200% (Figure 12). There are
 304 notable outliers, however, such as Joffrey Ballet in 2016 with a $\sim 3,000\%$ increase (11). By focusing
 305 on lines between -100% and 200% , we can see a trend appearing, with many companies growing
 306 and shrinking at similar rates around similar times. Thus, plotting the within-year percent change of
 307 the S&P 500 as a proxy for the stock market, we can see that many companies' endowment balances
 308 reflect the performance of the stock market; this is unsurprising, given the inherent invested nature
 309 of endowments. To assess companies' "raw" performance—in other words, how they managed their
 310 endowments outside of their investment returns—we adjusted all percent changes for investment
 311 earnings or losses, which flattened the stock market trend (Figure 13). We use this flattened plot
 312 to investigate large decreases and increases in endowment funds, as well as long term behavior of
 313 endowments.

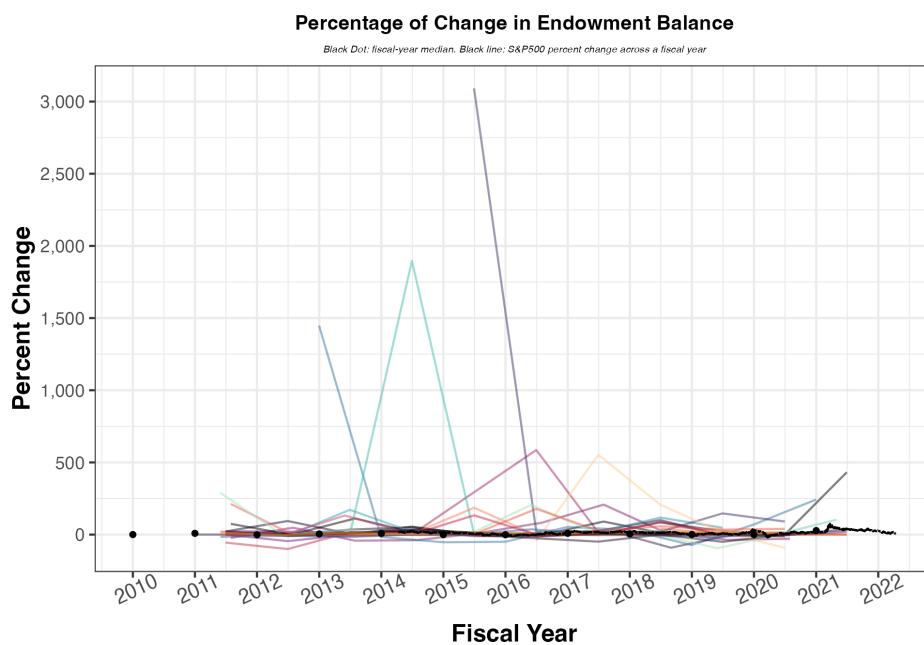


Figure 11. Percent change in endowment balance over time, including the full range of percent changes, revealing several clear outliers.

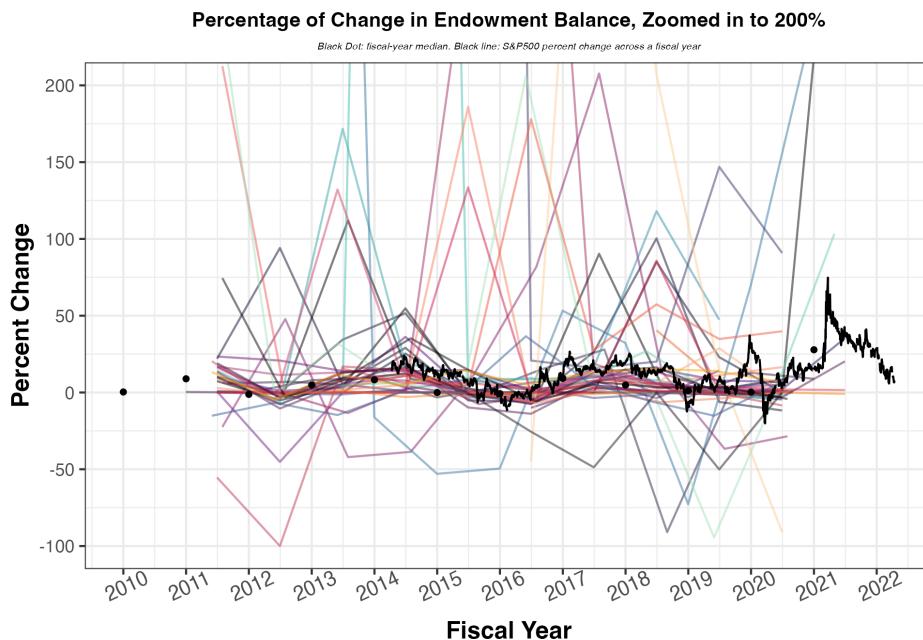


Figure 12. Percent change in endowment balance over time, restricting the range to -200 percent to 200 percent to remove outliers than reduce our ability to see trends for the majority of companies.

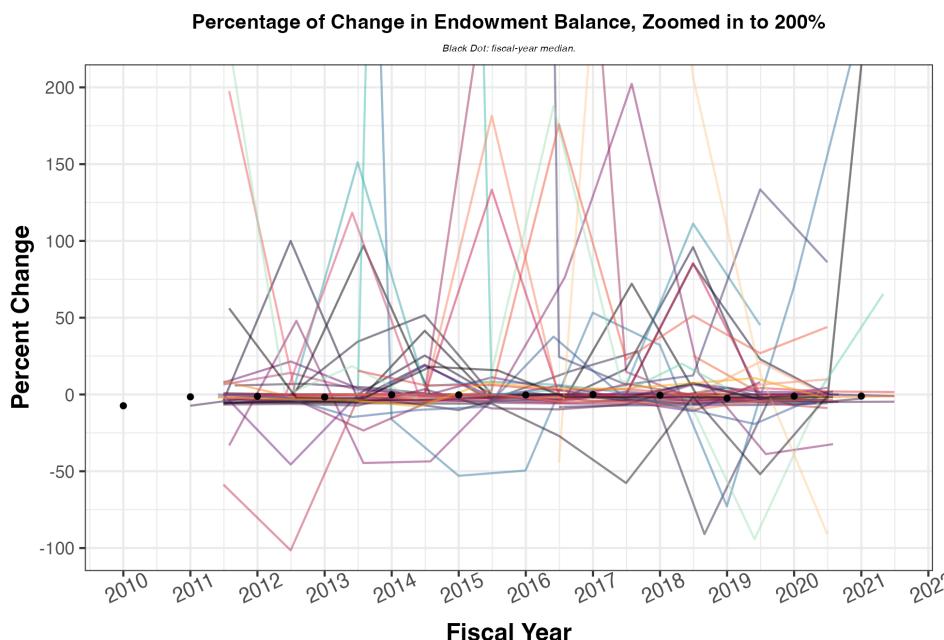


Figure 13. Adjusting for investment earnings or losses when computing the endowment percent changes flattens the trends we see when using the unadjusted endowment values.

314 Examining particular companies (Figure 14), we can see that eight companies reduce their
 315 endowment by over 40% (e.g. Percent Change lower than -40%) across multiple years. There are
 316 eight companies that do so (Table 4) Aspen Santa Fe Ballet, Atlanta Ballet, First State Ballet Theatre,
 317 Nashville Ballet, Orlando Ballet, San Francisco Ballet, and The Washington Ballet. Some of these
 318 companies reduce their endowments by over 40% multiple times. While we cannot say for certain
 319 why more companies have such severe reductions in endowment balance, reductions can indicate a

320 variety of situations for a company, such as: dispersing their funds into a new fiscal entity³, struggling
 321 financial in a given fiscal year, spending newly-unrestricted funds, or purchasing large items such as a
 322 building. Few companies severely reduce their endowment, thus the majority of US dance companies
 323 with endowments are able to maintain their savings and receive income from their endowments.

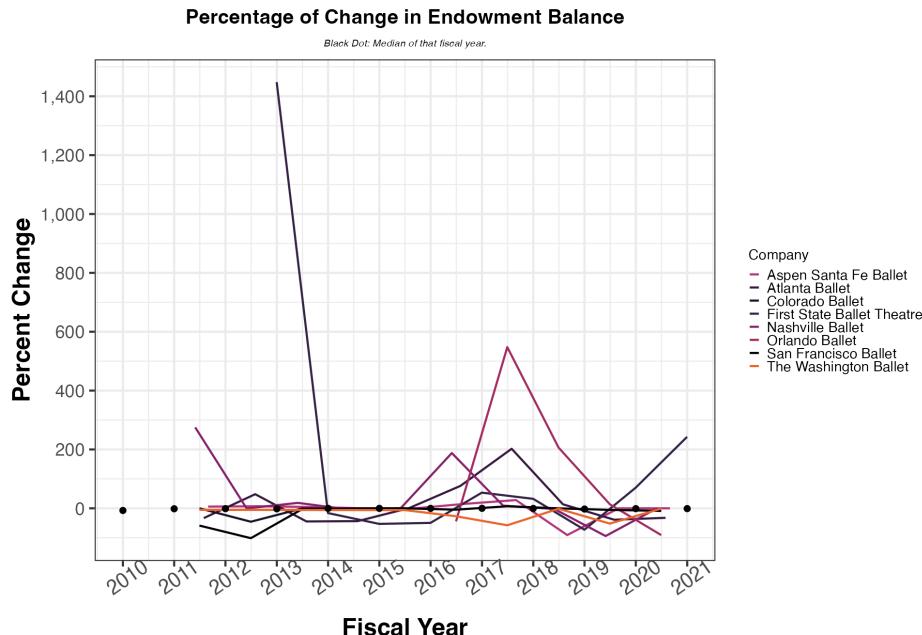


Figure 14. Companies that reduce their endowment by over 40 percent.

Table 5. Endowment Percent Change Dropping Below 40 Percent Of Beginning Year balance

Company Name	Percent Change	Beginning Balance	End Balance	Fiscal Year
Aspen Santa Fe Ballet	-90.9	6065013	550000	2018
Atlanta Ballet	-43.5	1706513	1046921	2014
Atlanta Ballet	-44.6	2947203	1706513	2013
Colorado Ballet	-45.6	182437	100000	2012
First State Ballet Theatre	-72.7	36693	10000	2018
First State Ballet Theatre	-49.5	35876	18107	2015
First State Ballet Theatre	-53.0	76261	35876	2014
Nashville Ballet	-94.2	1095624	61350	2019
Orlando Ballet	-91.0	7732855	696082	2020
Orlando Ballet	-44.3	613186	338943	2016
San Francisco Ballet	-101.5	1035814	174	2012
San Francisco Ballet	-58.7	2318646	1035814	2011
The Washington Ballet	-51.9	621423	310000	2019
The Washington Ballet	-57.6	1212247	621423	2017

³ Aspen Santa Fe Ballet transferred their endowment into Aspen Santa Fe Ballet Endowment Inc in 2018, causing their 90% reduction of funds

Table 6. Endowment Percent Change Increasing Beyond 200 Percent Of Beginning Year Balance

Company Name	Percent Change	Beginning Balance	End Balance	Fiscal Year
Atlanta Ballet	202.3	2119967	6523144	2017
Ballet Arizona	586.1	601399	4126424	2016
Ballet Hispánico	426.8	1405952	7481852	2021
First State Ballet Theatre	242.7	16999	58253	2020
First State Ballet Theatre	242.7	16999	58253	2020
First State Ballet Theatre	1448.1	5874	90934	2012
Fort Wayne Ballet	1803.3	60137	1201082	2014
Joffrey Ballet	3091.4	35600	1136139	2015
Nashville Ballet	275.0	54543	212030	2011
Orlando Ballet	206.4	2212808	6791249	2018
Orlando Ballet	547.7	338943	2212808	2017

324 Additionally, we can see that eight companies increased their endowment by over 200% (percent
 325 Change higher than 200%) across multiple years, which means they at minimum tripled their
 326 endowment (15). These eight companies are: Atlanta Ballet, Ballet Arizona, Ballet Hispánico, First
 327 State Ballet Theatre, Fort Wayne Ballet, Joffrey Ballet, Nashville Ballet, and Orlando Ballet. Such
 328 dramatic increases are potentially indicative of large donations, liquidation of assets such as buildings,
 329 or aggregation of funds from separate endowment accounts.

Percentage of Change in Endowment Balance

Black Dot: Median of that fiscal year.

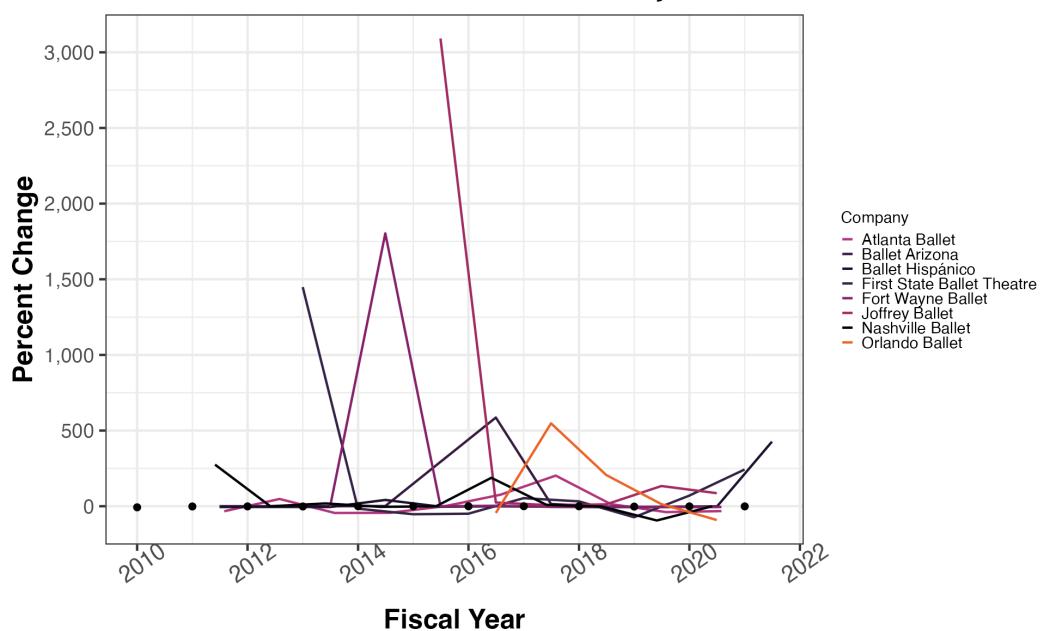


Figure 15. Annual percent change for companies that increased their endowment over 200 percent.

330 To examine the behavior of endowments, we ranked each company by its consistency over time.
 331 We define consistency by ranking companies by their standard deviation of a company's percent
 332 change across all years on file. The smaller the standard deviation, the more consistent the company's
 333 endowment behavior was, thus the higher the rank. (Figure 16). We find that many companies

³³⁴ who have consistent balances tend to not make large adjustments to their percent change. Further,
³³⁵ consistency in endowment does not appear to be related to company size (Figure 17), as measured by
³³⁶ both endowment total balance and number of employees.

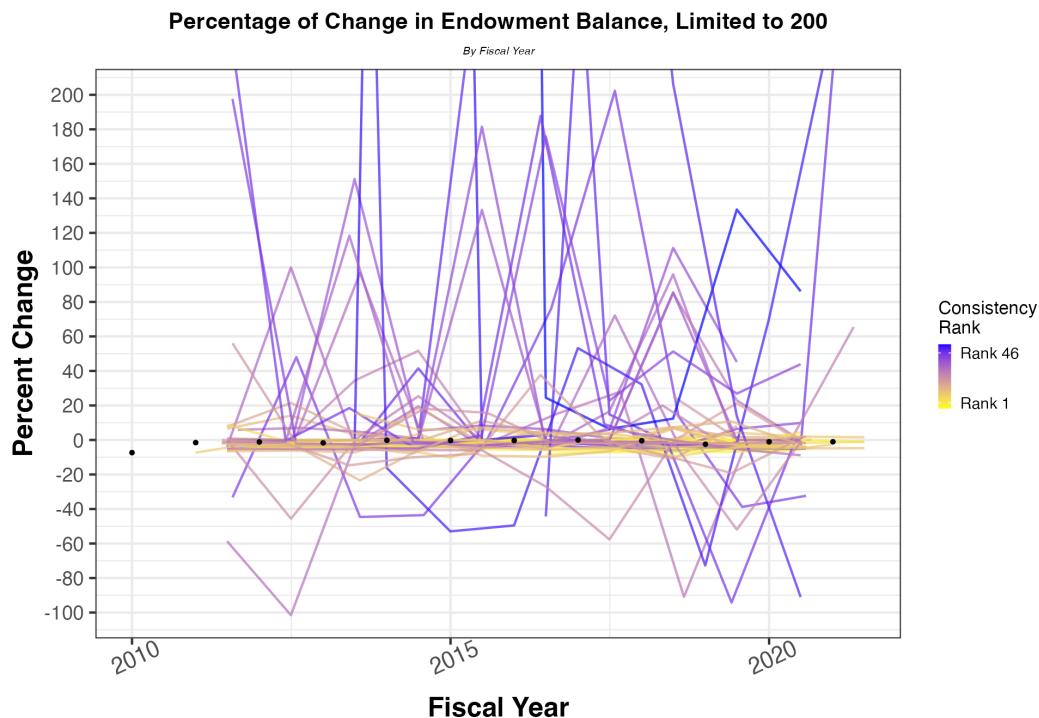


Figure 16

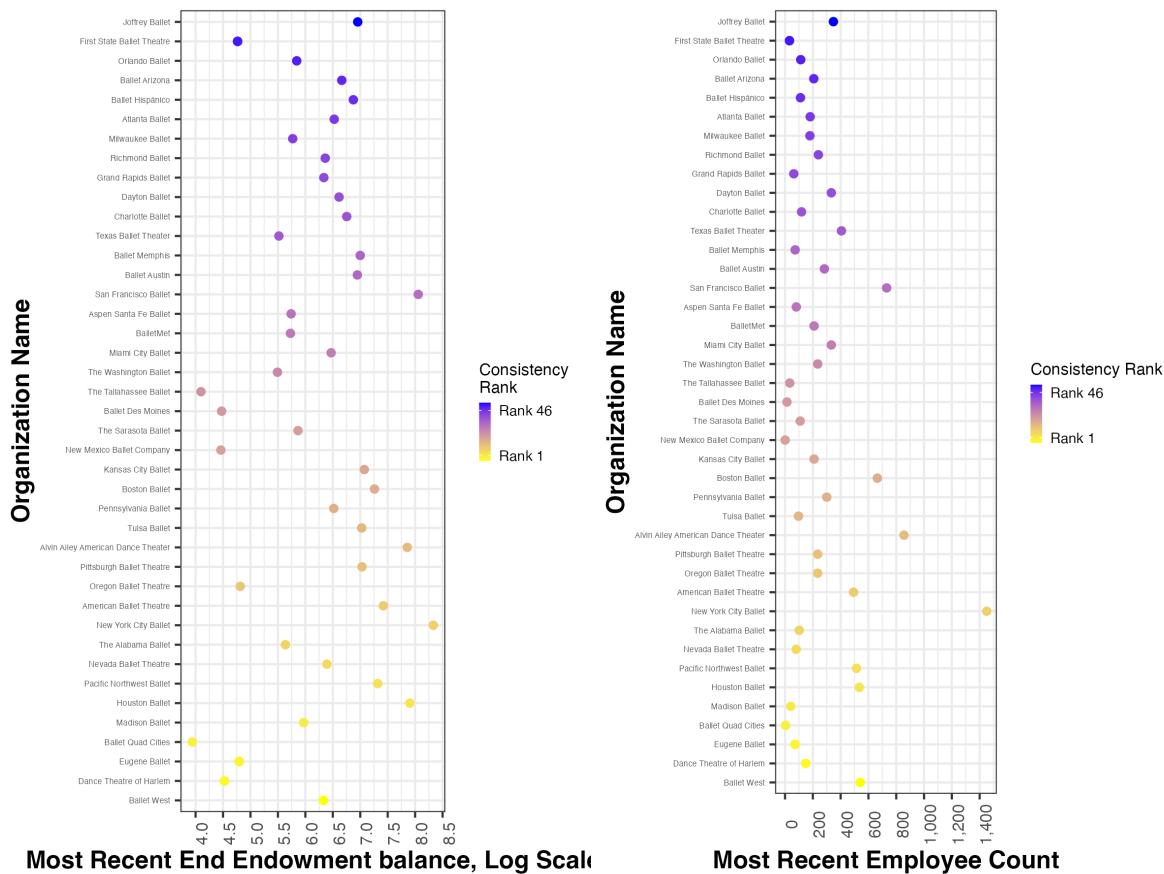


Figure 17

337 4.1.7. Compound Annual Growth Rate

338 The compound annual growth rate is a useful way to summarize the performance of different
 339 endowments over the same time period, since the variability in annual growth rates can make it
 340 difficult to see broader trends. We can think of this rate where, if the value grew by this same rate each
 341 year, would give us the end value at the end of the time period considered.

342 When we look at compound annual growth rate in this setting, we want to account for withdrawals
 343 and contributions to separate how endowments are doing due to investment decisions versus how
 344 they change due to large contributions or withdrawals.

345 The basic formula for the compound growth rate over t years is

$$\text{Compound Annual Growth Rate} = \left(\frac{\text{End Value}}{\text{Beginning Value}} \right)^{\frac{1}{t}} - 1.$$

346 Withdrawals as reported on the 990 include other expenditures, grants and scholarships, and
 347 administrative expenses.

348 This means we can compute the withdrawals for any given year and company as

$$\text{Withdrawals} = \text{Other Expenditures} + \text{Administrative Expenses} + \text{Administrative Expenses} + \text{Grants and Scholarships}.$$

349 To adjust for contributions and expenditures, we define the Compound Annual Growth Rate as

$$\left(\frac{\text{End Value} + \sum_{i=1}^{t-1} \text{Withdrawals} - \sum_{i=1}^{t-1} \text{Contributions}}{\text{Beginning Value}} \right)^{\frac{1}{t}} - 1.$$

350 Adding back the withdrawals and subtracting off the contributions allows us to see differences
351 that are due specifically to investment choices. Otherwise, we would not be able to tell whether a large
352 increase in endowment funds in a particular year was due to investment gains or a large contribution.

353 In Figure 18, we compare the compound growth rates of the companies to the compound growth
354 rate of the S&P 500 over the same time period, where we use the S&P 500 as a benchmark to indicate
355 how the stock market is doing overall. Variations in the S&P 500 across companies for a given time
356 interval are due to differences in their fiscal years. While Ballet Arizona and San Francisco have
357 enormous differences when considering the time intervals 2011 to 2020 and 2015 to 2020, it is unclear
358 whether these changes are truly this large in magnitude or if the differences are due to discrepancies
359 in reporting. Although we reached out to both companies to clarify discrepancies in early years, we
360 received no reply.

361 A substantial proportion (about 40% of the companies for the 2011-2020 time period, and about
362 50% of companies for the 2015-2020 and 2017-2020 time periods) had a compound annual growth rate
363 less than 0.05%. We see the same concept at a more granular level considering the annual growth rates
364 in Figure 19.

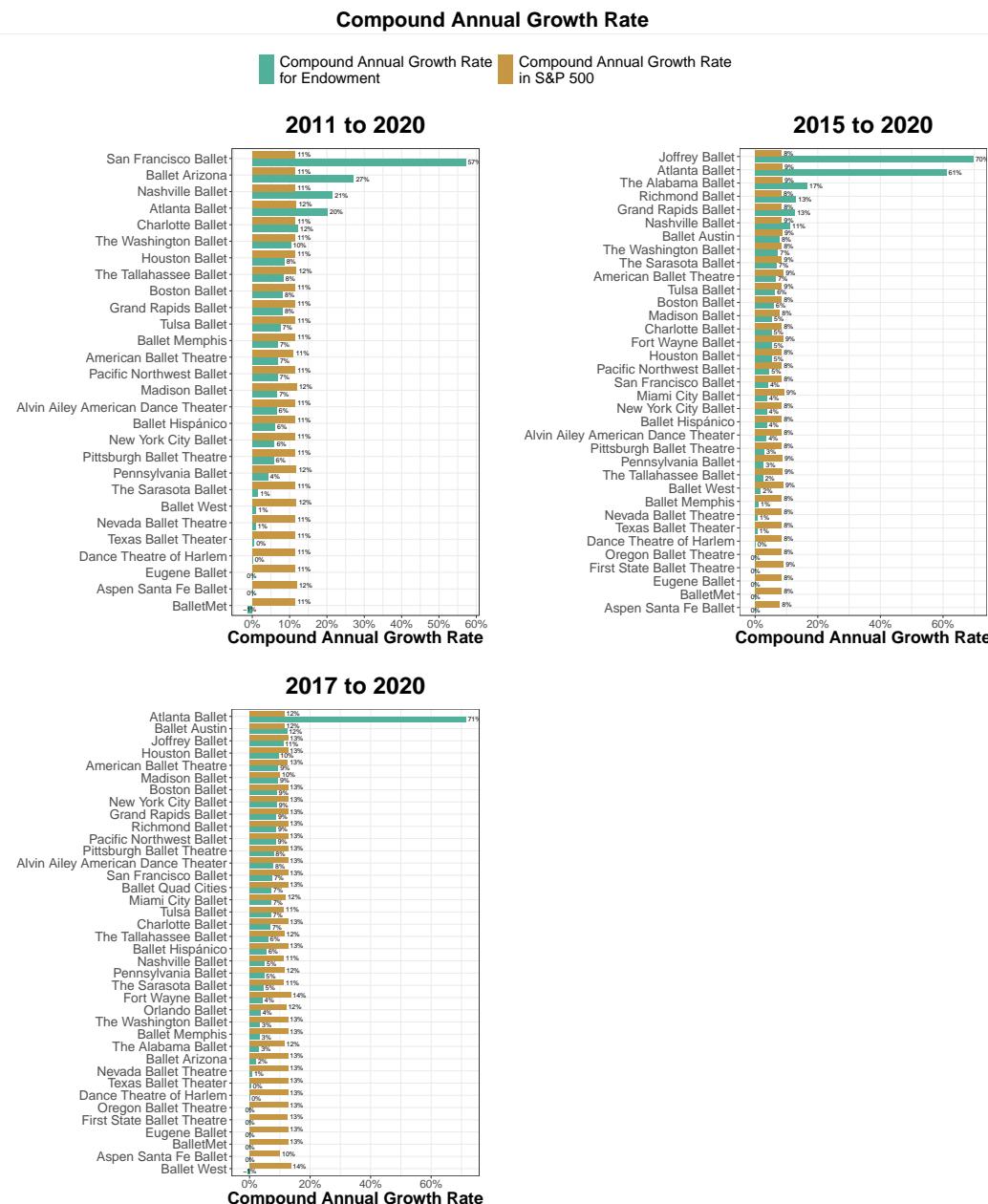


Figure 18. Compound annual growth rates for all organizations compared to the compound annual growth rate for the S&P 500 for three time periods. Not all companies are present in each plot, since not all companies have data going back the same number of years. Of note, year to year differences in the compound annual growth rate of the S&P 500 are due to differences in companies' fiscal years.

Annual Growth of the S&P 500 Compared to the Annual Growth in Endowments

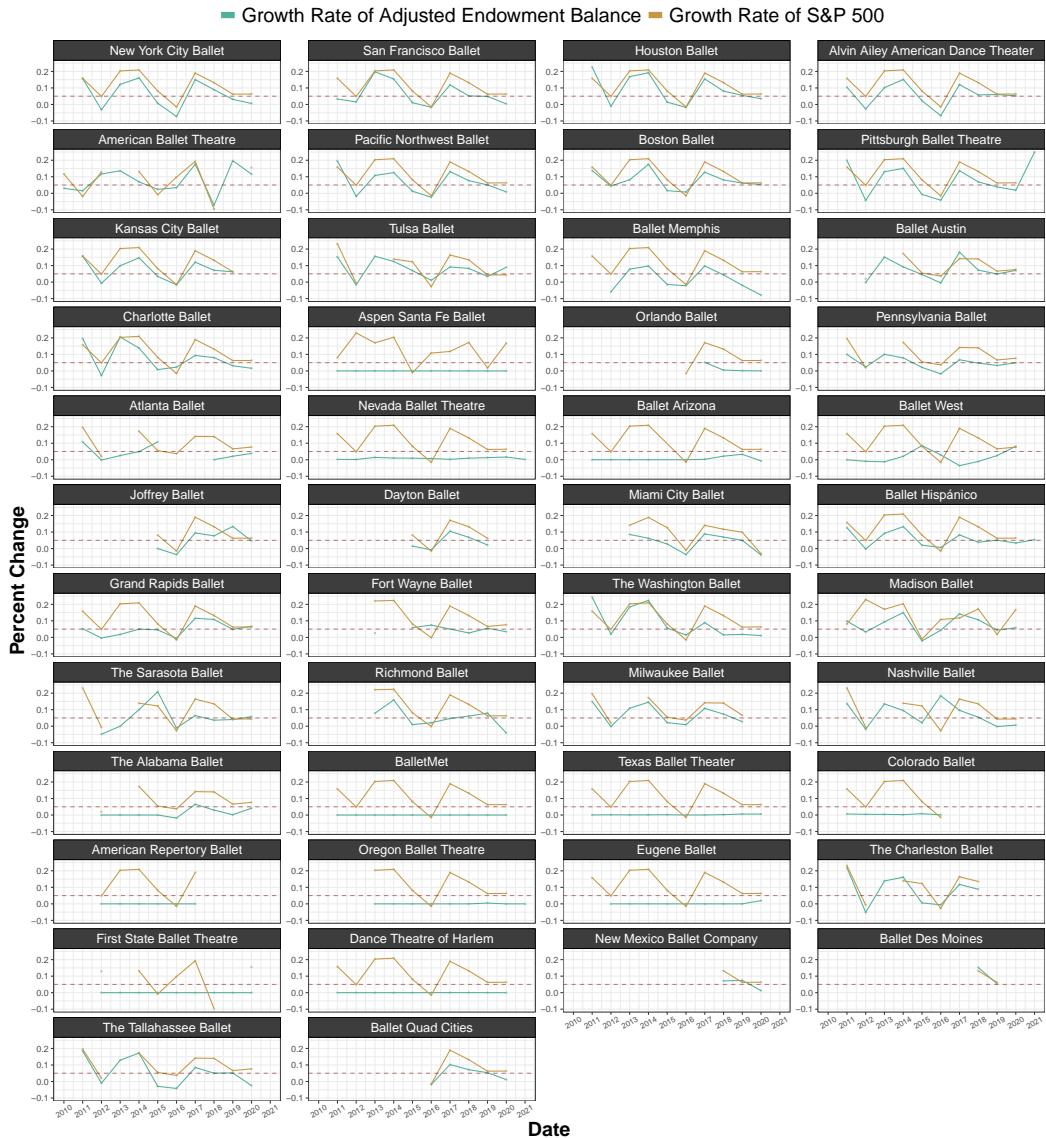


Figure 19. Annual growth rate of a company's endowment when adjusting for contributions and withdrawals, compared to the annual growth S&P 500 for the corresponding time period.

365 4.2. Volunteer & Paid Labor

366 4.2.1. Volunteer Labor and Geography

As we see in Figure 20, the South has the most companies who use more volunteers than employees with 68% of all reported companies volunteers, followed by the Midwest, then the West, then Mid-America, New England, and finally the Mid-Atlantic.

Distribution of Company Type in each Region

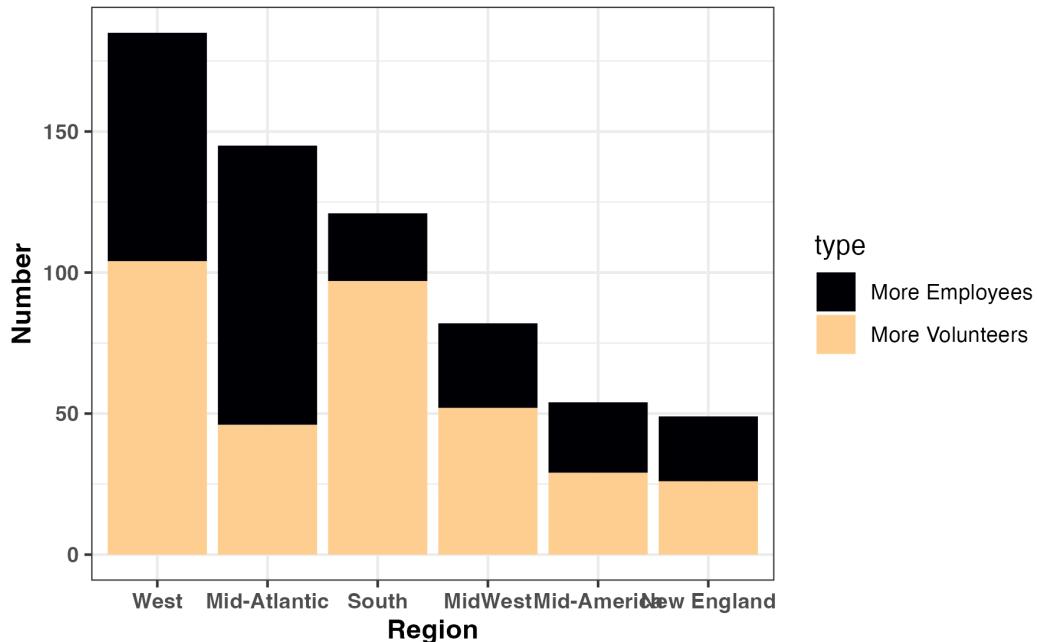


Figure 20. Total number of laborers reported for each region in the 2019 fiscal year, colored by the number of companies who report either more employees or more volunteers

In Figure 21, we show the 1st, 2nd, 3rd, and 4th quantiles of total volunteer labor. We ranked individual companies by the total number of volunteers they reported and then computed the quantiles. The share within each quantile is shown by region.

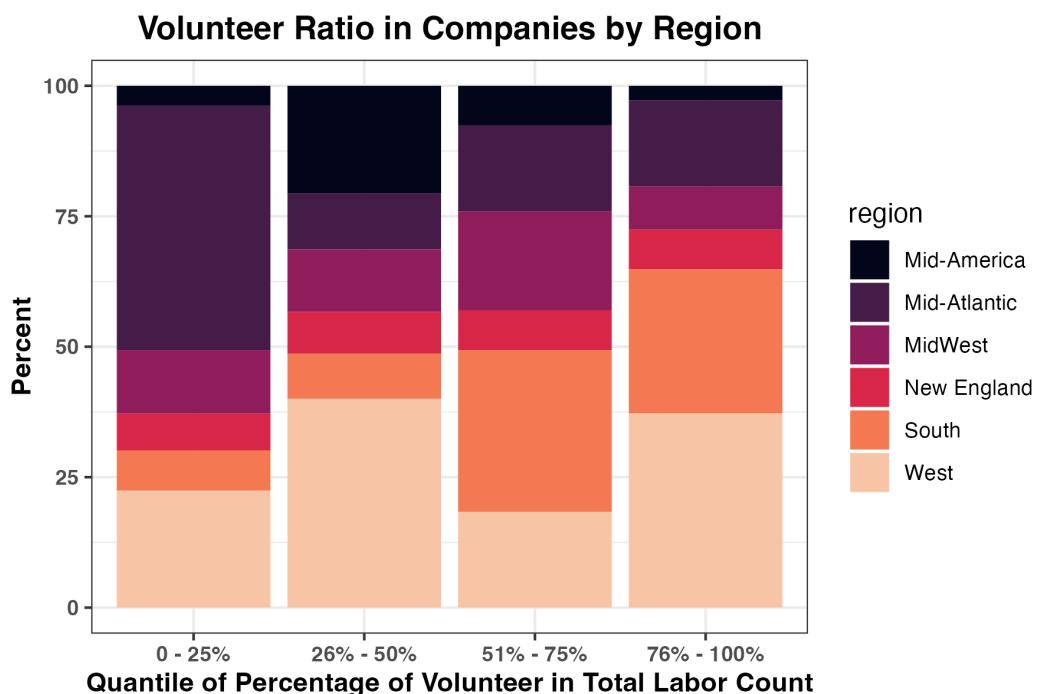


Figure 21. Share of volunteer use for each region by quantile using individual companies.

We visualize the percentage of total labor that was volunteer labor by state across the United States in Figure 22.

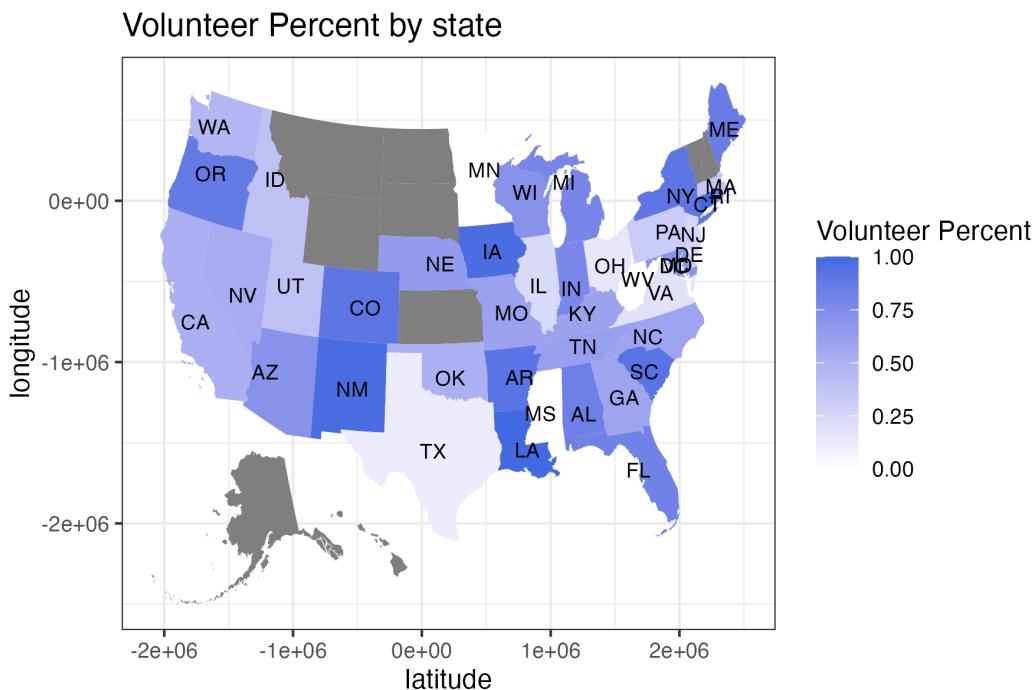


Figure 22. Share of volunteer labor among all labor by state. States, where we do not have data, are in gray.

375 4.2.2. Compensation to Top Employees

376 As we think about paid and unpaid labor in the dance industry, it is also useful to look at how
 377 compensation is distributed among paid employees.

378 In Part IX of the Form 990, companies report compensation going to the set of top employees – in
 379 particular, “officers, directors, trustees, and key employees”; we refer to this set of top employees as
 380 C-Suite employees. Additionally, they report the total compensation to all employees.

381 This information allows us to compare what percent of total employee compensation was going to
 382 C-Suite employees. For this analysis, we only included companies with more than 45 employees. This
 383 choice was due to the extent of variability in the percentages paid to C-Suite employees in companies
 384 smaller than this threshold size, since there are some years where smaller companies report zero
 385 compensation to C-Suite employees.

386 Of note, Aspen Santa Fe Ballet has previously contacted DDP® regarding C-Suite compensation,
 387 as they amended their fiscal year 2020 990s; however, as the IRS is behind in its uploading of amended
 388 returns, we do not have the corrected information.

389 The percentage paid to C-Suite employees ranges from 0% to a little over 30%, and is fairly
 390 constant over the years (Figure 23). The median for each fiscal year was close to 10%. However, we
 391 do see with the limited data available for 2021 that percentages appear to increase following the onset
 392 of the pandemic; this trend will be important to consider as more data from 2021 is released.

393 In Figure 24, where we summarize the difference in the percentage of total compensation paid to
 394 C-Suite employees in 2020 to that in 2015, we see there’s actually fairly even split between companies
 395 that increased the percent paid to C-Suite employees versus those that decreased the percent going to
 396 C-Suite employees.

Percent of Total Compensation Paid to C-Suite Employees

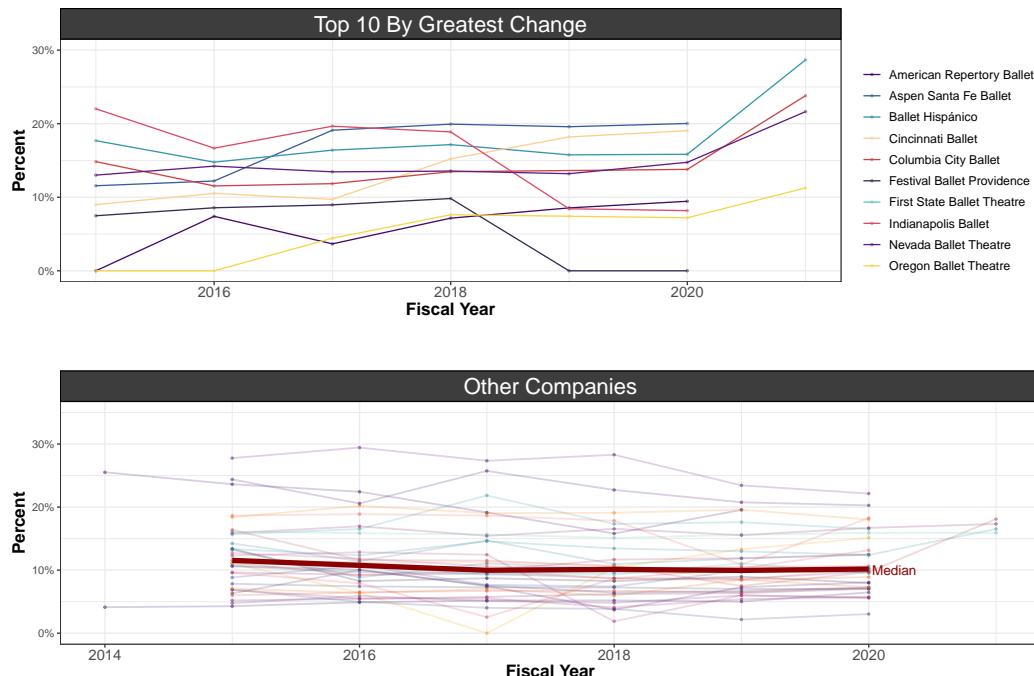


Figure 23. percent of the total compensation paid to employees that was paid to officers, directors, trustees, or key employees, as reported in Part IX of the Form 990. Highlighted in the first panel are the 10 companies that had the greatest change in the percent paid to C-Suite employees from the earliest year on file to the latest. Only companies with more than 45 employees and that reported complete data for more than 5 years are included.

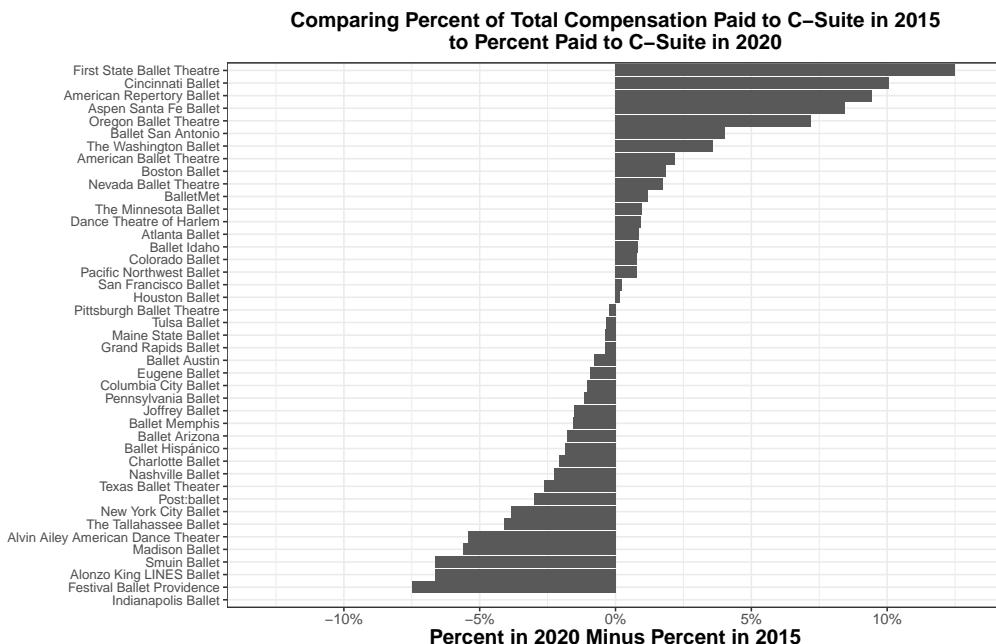


Figure 24. Comparing the percent of total compensation paid to C-Suite employees in 2015 to that in 2020. Since we are subtracting the 2015 percent from the 2020 percent, positive values indicate a greater percent of compensation went to C-Suite employees in 2020, while negative values indicate a smaller percent of compensation went to C-Suite employees in 2020.

³⁹⁷ 4.3. Buildings

³⁹⁸ In-person performances are a huge part of dance companies' business, and many of shows are
³⁹⁹ held in companies' own theaters. Therefore, analyzing how each company's endowment of buildings
⁴⁰⁰ and lands, especially their book values, is important in understanding how these companies are faring
⁴⁰¹ economically. In this analysis, we define book values as the value of the asset recorded on the balance
⁴⁰² sheet, as reported in Part VI of Schedule D of the Form 990. For all the analyses included below, the
⁴⁰³ book values are summed from all the buildings and lands owned by the company.

⁴⁰⁴ In the following plots, we consider one quantile at a time because these values are on such
⁴⁰⁵ different scales, with some companies approaching 8×10^7 in book values, while others had less than
⁴⁰⁶ 1×10^5 .

⁴⁰⁷ 4.3.1. The Trend in Property Book Values (high/medium/low by quantile)

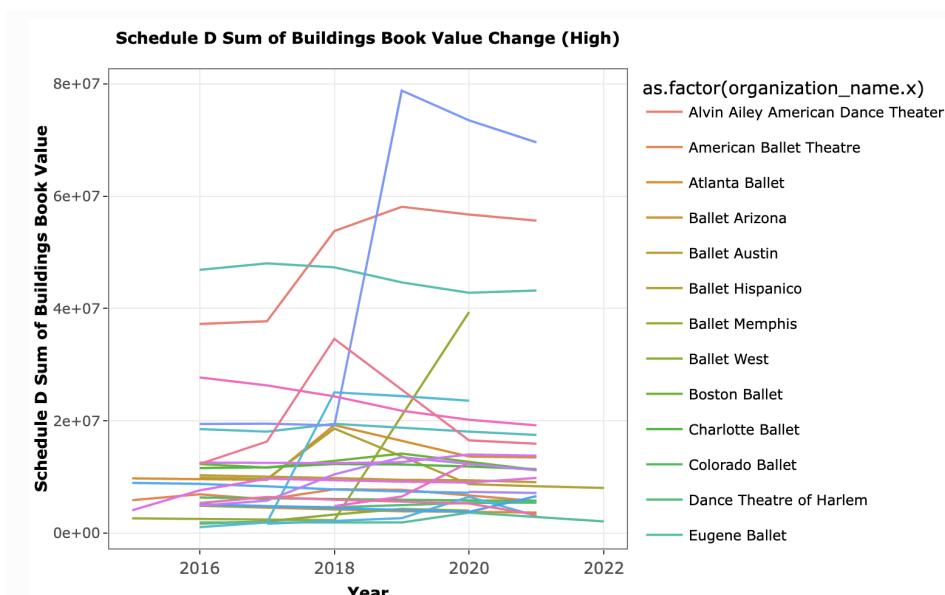


Figure 25

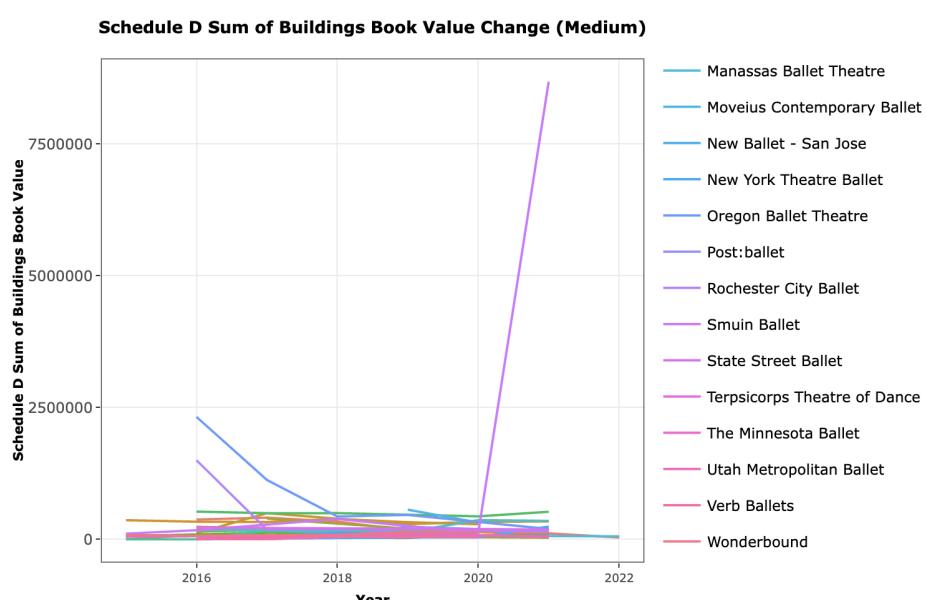
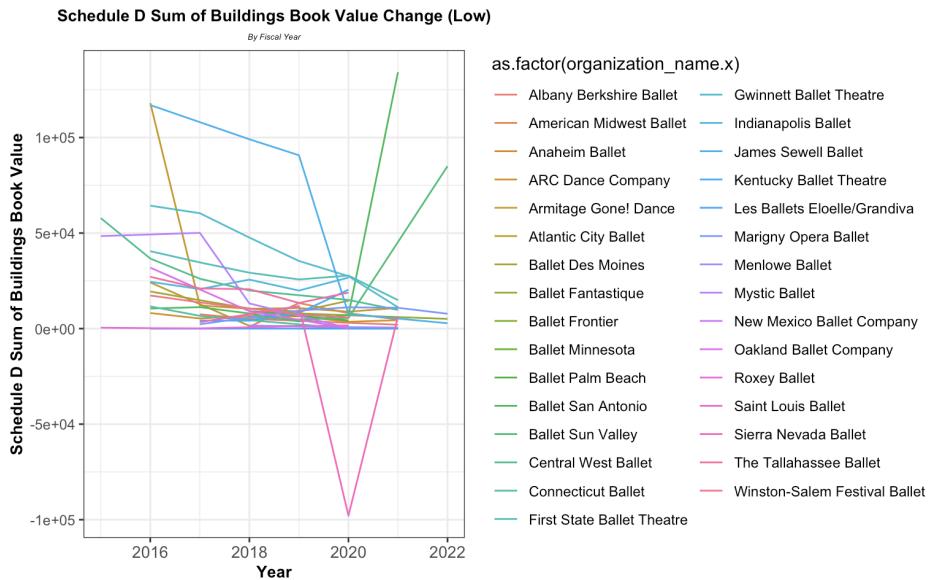


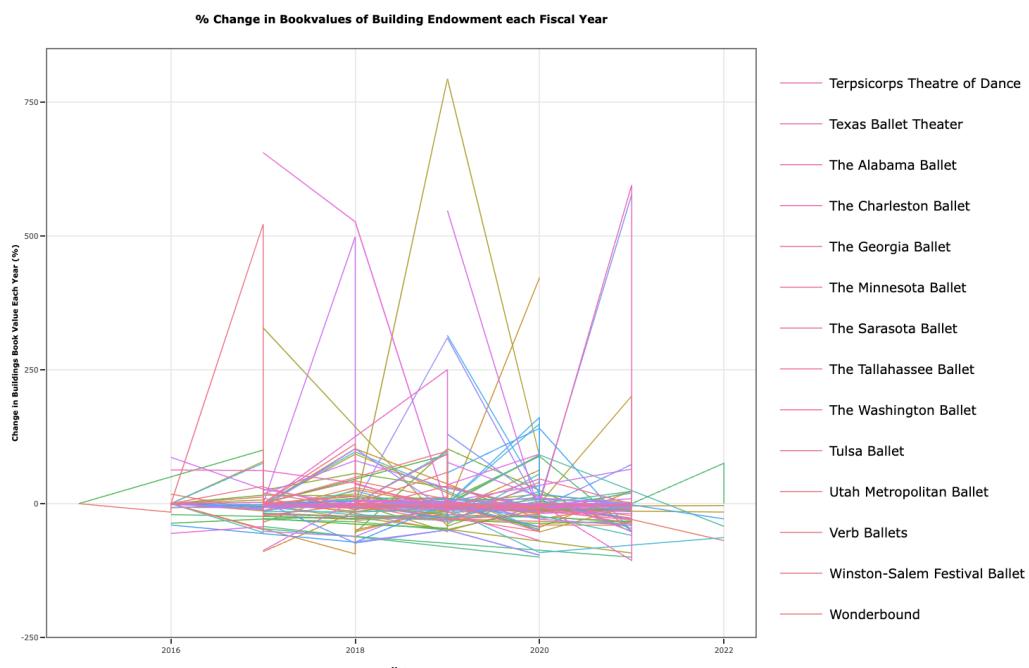
Figure 26

**Figure 27**

408 In Figures 25, 26, and 27, we see the percent changes in buildings' book values for each company
 409 from 2014 to 2021. We divided companies into three groups based on their building's book value: high,
 410 medium, and low, based on the quantile of their book values in 2020. Companies with notable changes
 411 for each category are:

- 412 • Major: New York City Ballet, Ballet Memphis, Tulsa Ballet.
- 413 • Medium: Smuin Ballet
- 414 • Low: Saint Louis Ballet, Les Ballets Eloelle/Grandiva, Ballet Palm Beach, Ballet

417 4.3.2. Percent change in Building Book Values



418 Most companies did not go through large changes in book values of buildings in their endowment
 419 besides depreciation. The companies went through larger changes include Utah Metropolitan Ballet,
 420

421 Post:ballet, Ballet Memphis, Philadanco, New Ballet San Jose, Sacramento Ballet, Marigny Opera Ballet,
 422 and Ballet Idaho.

423 4.3.3. Percent Change in Ranking

EIN	organization_name.x	year	change	BookValueSum
222587551	Island Moving Company	2017	Inf	166179
203447830	Boulder Ballet	2016	-3.390870e+04	85536
205888512	Collage Dance Collective	2021	9.567292e+03	695755
943197247	Smuin Ballet	2021	7.188102e+03	8681806
591837297	Florida Ballet Jacksonville	2021	5.812052e+03	1563324
311784286	BalletX	2018	3.496035e+03	797277
383945001	Cleveland Ballet	2021	2.000687e+03	58105
391134735	Milwaukee Ballet	2019	1.889604e+03	23903282
742371103	Ballet San Antonio	2021	1.763694e+03	134186
341645238	Verb Ballets	2018	1.652558e+03	47950
811657501	New Ballet - San Jose	2017	1.470690e+03	14576

424

425 4.3.4. Percentage change in book value by year

426 We can see from the mean that many extreme values exist in terms of changes in the building's
 427 book values.

428 5. Conclusions

429 5.1. Data Quality

430 As stated in the introduction, online reporting of tax returns by dance companies has facilitated
 431 this research; however, a long-standing issue with publicly-available tax reporting is there is no
 432 guarantee that mistakes are not made and published. Therefore, a significant part of our analyses were
 433 focused on checking the quality, completeness, and aberrations in values reported on the 990 forms.
 434 We found many discrepancies indicating non-concordance concerning the end of year balances and
 435 beginning year balances within the same year for many companies, where the values reported don't
 436 match indicating missing information. Additionally, values reported for previous years did not match
 437 what certain companies actually filed for those years with no apparent explanation. Many companies
 438 we reached out to for clarification did not respond. This issue should be addressed in future analyses.
 439 Implications for missing or inaccurate reporting on form 990s and 990EZs include misinforming the
 440 public. Data analyses run on inaccurate information may also draw false conclusions towards financial
 441 practices of certain companies that don't really exist. Informing dance companies on the importance of
 442 proper tax reporting may help address these errors in the future.

443 5.2. Endowments and the S&P 500

444 Our analyses have demonstrated that the trends of the stock market, and particularly the S&P 500,
 445 heavily influence percent change in the endowments of many companies. Other companies perform
 446 very differently from the S&P 500. This indicates that companies significantly differ in their investment
 447 behavior. Some companies differ in their investment behavior. Some companies, such as Oregon Ballet
 448 Theatre and Aspen Santa Fe Ballet, did not invest their endowments at all. Others, including San
 449 Fransico Ballet, Arizona Ballet, Joffrey Ballet, and Houston Ballet, saw substantial investment gains
 450 over the years we analyzed. This has significant implications for the individual dancers employed by

451 these companies in terms of compensation opportunities as well as job security. A company that does
 452 not earn investment income risks long-term operation deficits due to inflation and unforeseen expenses.
 453 Therefore, it is important to continue to examine changes in endowments for dance companies over
 454 time and clearly communicate these findings to the dance world.

455 *5.3. Employee and Volunteer Labor*

456 *5.3.1. By Geographical Region*

457 Overall, more labor (both volunteer and employee) is used in the West, followed by the
 458 Mid-Atlantic, then the South, then the Midwest, then Mid-America, and finally New England. Of these
 459 regions, the one with the highest proportion of companies who rely more on volunteer labor than
 460 paid employees is the Midwest, followed by the West, then Mid-America, New England, and then
 461 the Mid-Atlantic. This indicates that a few things could be happening in the world of dance. First, in
 462 regions with high rates of volunteer labor, there may be a higher percentage of community engagement.
 463 This is especially true for companies such as Eugene Dance in Oregon from the West region, which
 464 reports a significant number of volunteers but generates significant community support for their
 465 productions. Secondly, in regions with high rates of employee labor, state, and local governments
 466 may subsidize compensation costs which increase companies' ability to hire and pay their employees.
 467 Since dance is known to be an industry with a disproportionate amount of unpaid labor, it is especially
 468 important to understand where and why these discrepancies occur.

469 *5.4. Compensation and Building Value*

470 We also examined the fraction of compensation going to senior executives (i.e. their C-Suite
 471 employees) is generally consistent. Future research should track trends of executive compensation
 472 throughout the pandemic. Additionally, the pattern of how dance companies use their building
 473 endowment is inconsistent. Further investigation is required to fully understand why and how real
 474 estate is used by these companies.

475 The wide-ranging impacts of these understandings may lead to greater awareness by unpaid
 476 and underpaid laborers in dance, accountability for dance companies, and more equity in the dance
 477 industry. We hope this work provides motivation for further investigation of dance companies' publicly
 478 available 990 data to better understand the financial performance and decisions of dance companies,
 479 as well as other companies in the performing arts.

480 **6. Limitations**

481 Our analyses were not without limitations. First, certain companies have discrepancies in their
 482 End-of-Year and Beginning-of-Year balances. We used End-of-Year balances to calculate the percent
 483 change in endowments of all dance companies, so some information may be misrepresented based
 484 on these discrepancies. Additionally, data on a finer time scale, for example at the monthly time
 485 scale rather than the yearly, would be more informative for studying how investments did over time;
 486 however, 990 Forms only provide this data annually. Another limitation of this work is the analysis of
 487 compensation. The Form 990 provides summarized information across total employees, along with
 488 some information about compensation to C-Suite executives. However, we cannot tell directly from
 489 this data which of these employees are dancers, and as such, we cannot tell how dancers are being
 490 compensated relative to other employees. Finally, a significant number of companies did not report
 491 their number of employees and/or their number of volunteers. This led to missing data that was
 492 left out the geographical and unpaid labor analyses. Nine states (New Hampshire, Vermont, Kansas,
 493 Wyoming, South Dakota, North Dakota, Montana, Hawaii, and Alaska) did not have any companies
 494 in this analysis.

495 **7. Future Research**

496 Because the IRS is greatly behind on releasing Form 990s, we only have data from 2021 for a
 497 smaller subset of companies, 29 companies in total. That said, the effect of the COVID-19 pandemic on
 498 all trends we have examined here is a crucial area of future research. Because the federal government
 499 issued billions of dollars in public subsidies, trends throughout the pandemic would be helpful
 500 to identify whether these subsidies helped those intended. Similarly, we would like to see if the
 501 COVID-19 pandemic has changed the way companies used and reported their building endowment
 502 found in this study. Lockdown policies in each state might change how in-person performances were
 503 held, and companies might shut down certain performance centers due to prolonged quarantine.
 504 Therefore, future research on buildings' book values should be conducted after more data in 2021 and
 505 2022 is uploaded. Yet, to date, no comprehensive analysis has been done on the wage gap in dance
 506 throughout the pandemic. Once tax documents through 2022 are filed for these companies, future
 507 research can examine how wages, income, operations, and unpaid labor at dance companies have
 508 evolved throughout the pandemic.

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 510 Elizabeth Yntema.

511 **Conflicts of Interest:** The authors declare no conflict of interest.

512 **Abbreviations**

513 The following abbreviations are used in this manuscript:

514 DDP ® Dance Data Project ®
 515 IRS Internal Revenue Service

516 **References**

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