



# AN UPDATE ON PENSION OBLIGATION BONDS

By Alicia H. Munnell, Jean-Pierre Aubry, and Mark Cafarelli\*

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## INTRODUCTION

This update shows how Pension Obligation Bonds (POBs) have fared since the financial crisis. This instrument, which is a general obligation of the government, alleviates pressure on the government's cash position; and it may offer cost savings if the bond proceeds are invested, through the pension fund, in assets that realize a return higher than the cost of the bond. At the time of our last study, 2009 data showed that most issuers had lost money by issuing a POB.<sup>1</sup> One question is the extent to which five additional years have changed that picture. The earlier study also looked at the factors leading a state or locality to issue a POB and concluded that those least able to absorb the risk were the most likely to do so. The second question is whether that continues to be the story.

The *brief* proceeds as follows. The first section presents a brief history of POBs from their introduction in 1985 to the present. The second section

introduces the rationale for, and possible risks associated with, issuing a POB. The third section evaluates POBs at three points in time: 2007 (at the height of the stock market), 2009 (in the midst of the financial crisis), and 2014 (today). The fourth section summarizes the regression results – using an expanded sample that includes cities that do not administer their own pension plan – that relate the probability of issuing a POB to the financial pressures of the sponsor, the economic environment, and financial conditions such as the “expected spread” between interest rates and stock market returns. The fifth section presents a two-fold conclusion. On the one hand, five years of economic recovery have improved the performance of POBs; on average they have produced a real internal rate of return of 1.5 percent. On the other hand, while POBs could potentially be a useful tool under the right circumstances, evidence to date

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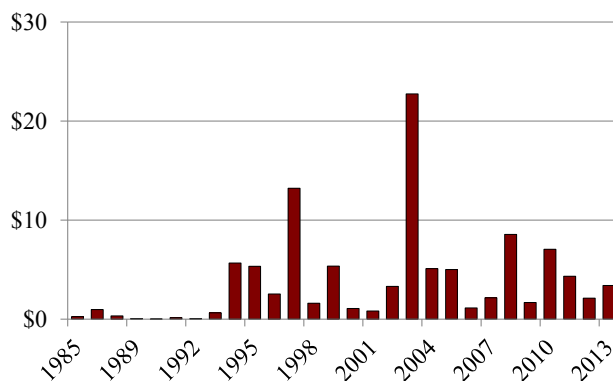
suggests that the jurisdictions that issue POBs tend to be the financially most vulnerable with little control over the timing.

## BACKGROUND

In 1985, the city of Oakland, CA, issued the first POB.<sup>2</sup> At the time, POBs offered city, municipal, and state governments a classic arbitrage opportunity. Issued on a tax-exempt basis, the government could immediately invest the proceeds through the pension fund in higher-yielding taxable securities, such as U.S. Treasury bonds, which would lock in a positive net return from the transaction.<sup>3</sup> However, because POBs (and all “arbitrage bonds”) deprived the federal government of tax revenues, Congress stopped state and local governments from issuing tax-exempt bonds solely to reinvest the proceeds in higher-yielding securities. Indeed, the Tax Reform Act of 1986 (TRA86), which did away with the tax exemption for POBs, appeared to mark an end for this instrument.

Surprisingly, POBs re-emerged in the 1990s. The strong performance of the stock market led some governments (and bankers) to see a potential arbitrage opportunity for taxable POBs. Two factors were important. First, taxable interest rates had come down considerably, which meant that POB borrowing costs were lower as well. Second, pension funds had increased their equity holdings substantially over the decade,<sup>4</sup> which generated higher returns for the plans and, thus, led actuaries to assume higher future returns. The combination of these two factors was enough to convince some governments that POBs offered an attractive “actuarial arbitrage.”<sup>5</sup>

FIGURE 1. PENSION OBLIGATION BONDS ISSUED FROM 1985-2013, BILLIONS OF 2013 DOLLARS

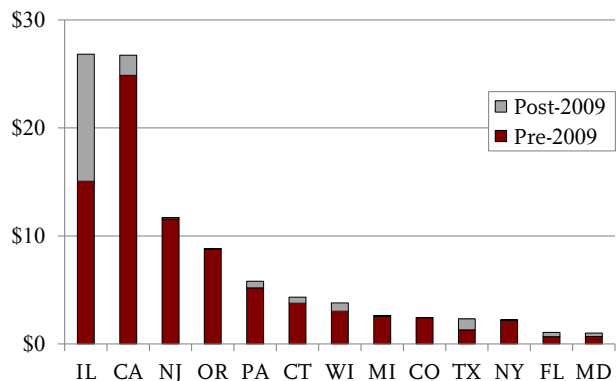


Source: Data set compiled from Bloomberg Online Service (2012), and SDC Thomson Reuters (2013) databases.

Since TRA86 and the end of arbitrage bonds, governments have issued about \$105 billion in taxable POBs. The most notable characteristic of the pattern of new issues is the spike in POB dollars issued in 2003 (see Figure 1), which is partly due to a single POB issuance worth almost \$10 billion (\$12.4 billion in 2013 dollars) by the state of Illinois.<sup>6</sup>

Even with the 2003 spike, the total amount of POBs issued in any given year has never been more than 1 percent of the total assets in public pensions. However, certain states and localities are more active in the POB market than others. Figure 2 shows total issuances by state from 1985 to 2013.<sup>7</sup> It is clear that the bulk of activity in POBs has been centered in about 10 states, with Illinois and California being major players.<sup>8</sup>

FIGURE 2. PENSION OBLIGATION BONDS ISSUED FROM 1985-2013 FOR STATES WITH MORE THAN \$1 BILLION ISSUED, BILLIONS OF 2013 DOLLARS



Source: Data set compiled from Bloomberg Online Service (2012) and SDC Thomson Reuters (2013) databases.

## THE PROS AND CONS OF ISSUING A POB

While the market remains small, it is clear that certain jurisdictions see POBs as attractive policy instruments. The available literature suggests two primary reasons for their appeal:<sup>9</sup>

- **Budget relief:** During periods of economic stress, governments use POBs for budget relief. State and local governments often face legal requirements to reduce underfunding. With declining revenues, officials may see POBs as the “least bad alternative” among a variety of tough fiscal choices.

- **Cost savings:** POBs offer issuers an actuarial arbitrage opportunity, which, in theory, can reduce the cost of pension obligations through the investment of the bond proceeds in higher risk/higher return assets. By commingling POB proceeds with pension assets, the assumption is that bond proceeds will return whatever the pension returns. Given that actuarial practice assumes public pensions will return about 8 percent, POBs can be a compelling proposition (especially to governments whose taxable borrowing costs are in the 5-6 percent range).

While the actuarial arbitrage highlighted above may be persuasive, the issuance of POBs poses serious risks:<sup>10</sup>

- **Financial:** The success of POBs depends on pension returns averaging more than the cost of financing the debt. However, these assumptions may not turn out to be correct.
- **Timing:** POBs involve considerable timing risk, as the proceeds from the issuance are invested en masse into the pension plan. Dollar-cost averaging would be the more measured approach to investing large sums of money.<sup>11</sup>
- **Flexibility:** While the issuance of a POB does not change the total indebtedness of the sponsor, it does change the nature of the indebtedness.<sup>12</sup> Requirements to amortize unfunded pension liabilities may be relatively flexible obligations that can be smoothed over time, while the POB is an inflexible debt with required annual payments.
- **Political:** If the government uses the POB to fully fund the pension, it may end up with a pension system having more assets than liabilities. Such overfunding may create the political risk that unions and other interest groups will call for benefit increases, despite the fact that the underfunding just moved from the pension plan's balance sheet to the sponsor's balance sheet.<sup>13</sup>

## EVIDENCE TO DATE

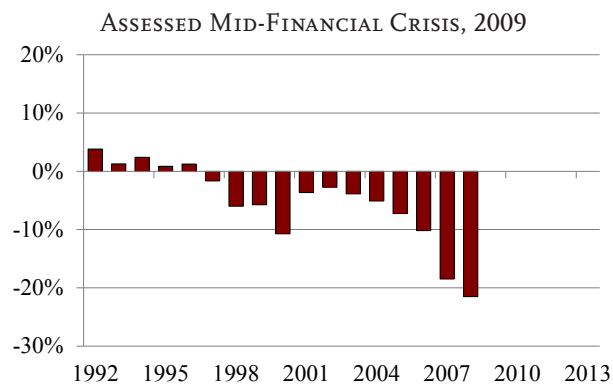
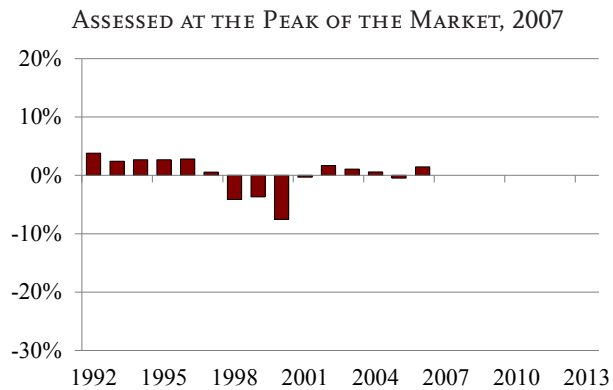
In order to assess the extent to which POBs have met issuers' expectations, we calculate the internal rate of return for all POBs issued in a given year. This analy-

sis is based on the universe of taxable POBs issued since the passage of TRA86 through 2013.<sup>14</sup> The universe includes 5,109 POBs issued from 529 different governing entities, totaling approximately \$98 billion in 2013 dollars.

We begin by looking at each bond issued in a given year. Of the 5,109 bond issuances in our data, 4,538 provide the detailed data needed to perform a meaningful assessment – the date of issuance, the date of maturity, the coupon rate, the par value, and the purchase price as a percent of par. The assumption is that the proceeds from each bond are invested in accordance with the allocation of the aggregate assets of state and local pensions from the Federal Reserve's *Flow of Funds* – approximately 65 percent in equities and 35 percent in bonds. Accordingly, we use the S&P 500 total return index and the Barclays 10-year bond total return index to approximate how the POB proceeds have grown over time. For each bond, beginning in year one, we calculate the growth of the invested bond proceeds for that year, then subtract the interest payment (using the stated coupon rate) to get a new beginning balance for the following year, and this process is repeated until the bond matures. For bonds that have not yet matured, the process is repeated until the date of the assessment. At maturity or date of assessment, we compare the ending balance with the initial proceeds to calculate an internal rate of return (IRR). These IRRs are then weighted by the size of the bond and the maturity (or, if the bond has not yet matured, the number of years between the date of issue and the assessment date) in order to calculate an aggregate IRR for each annual cohort of POBs.

The results demonstrate the risk associated with a POB strategy. If the assessment date is the end of 2007 – the peak of the stock market – the picture looks fairly positive (see Figure 3 on the next page). If assessed in the middle of 2009 – right after the market crash – most POBs appear to be a net drain on government revenues. And, as of February 2014, the majority of POBs have produced positive returns due to the large market gains that followed the crisis. Only those bonds issued at the end of the market run-up of the 1990s, and those issued right before the crash in 2007, have produced a negative return; all others are in the black.

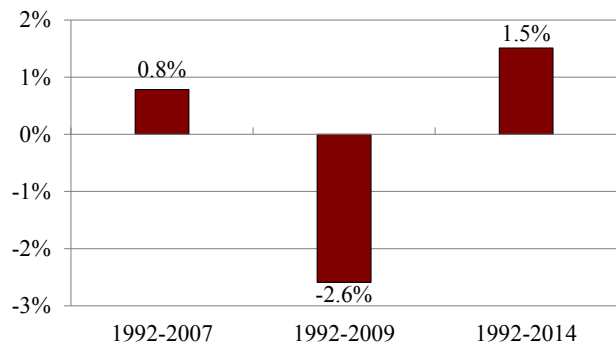
FIGURE 3. INTERNAL RATE OF RETURN ON PENSION OBLIGATION BONDS, BY YEAR ISSUED



Source: Authors' calculations based on total monthly returns of the S&P 500 from Standard and Poor's Index Services (1992-2014); total monthly returns of U.S. Treasuries from the *Ibbotson S&P Classic Yearbook* (2013); and the Barclays U.S. Treasury 10-year Term Index (2014). POB data are from Bloomberg Online Service (2012); and SDC Thomson Reuters (2013).

Weighting the bonds by their dollar amount and maturity (or, if the bond has not yet matured, the number of years between the date of issue and the assessment date), Figure 4 shows the average IRR for the three periods. Between 1992 and the peak in 2007, the average real return was 0.8 percent; by 2009 the average return had dropped to -2.6 percent; and over the period 1992-2014 – which includes both the financial crisis and the subsequent market rebound – the return was 1.5 percent. The story is still far from over, however, since many of these POBs have a 30-year life.

FIGURE 4. AVERAGE INTERNAL RATE OF RETURN ON PENSION OBLIGATION BONDS, 1992-2007, 1992-2009, AND 1992-2014



Source: See Figure 3.

## WHAT CONTRIBUTES TO THE ISSUANCE OF A POB?

In theory, governments with well-funded pension plans and sound fiscal health might find POBs advantageous if issued at periods when interest rates are particularly low. This type of issuer could shoulder the additional risk of a POB without jeopardizing its fiscal health. Or, for governments facing severe fiscal stress, POBs could be implemented as part of a larger pension reform plan in which the POB helps provide immediate relief while other reforms put the plan on the path to long-term sustainability.<sup>15</sup> So, the question is which governments issue POBs and why. The following regression analysis attempts to answer that question.

## THE DATA

The first step is to define the sample. The sample of issuers used in this analysis is larger than in the earlier study, because it includes both governments that sponsor their own pension plans and cities that participate in state cost-sharing plans. This broadening of the sample is important, because most of the POB occurrences come from local governments that only participate in a state-administered retirement system. Plan data for cities not administering their own plan are constructed based on the methods stipulated in the Governmental Accounting Standards Board's Statement 68.

The second step is to construct the dependent variable – a government issuing a POB in a given year. This step requires consolidating the multiple POB bonds into a single observation. For example, in 1997, the New Jersey state government issued 31 bonds; in this exercise, this information is consolidated to indicate that the New Jersey state government was a POB issuer in 1997. This process of consolidation results in 733 observations. Data limitations reduce the number of issues considered to 270.<sup>16</sup>

## ANALYSIS AND RESULTS

The probability of being one of the 270 POB issuances among the 140,000 states and localities is then assumed to depend on fiscal pressures facing the government, the economic environment, and financial variables such as the expected spread between interest costs and stock market returns.<sup>17</sup> The specific variables in the model included:<sup>18</sup>

### Fiscal Pressure on Government

- *Contributions/revenue.* Government contributions to the pension plan as a percent of total own-source government revenue. The assumption is that as the pension expenditure increases as a percentage of total government spending, the more likely the government is to issue a POB.
- *Debt/revenue.* Government debt as a percent of own-source revenue. The effect could go either way. A government with substantial debt may find it costly to issue a POB and therefore would not find it profitable. On the other hand, governments with high debt burdens could also be those facing large pension payments for unfunded liabilities, since the government may be more likely to defer pension contributions to make fixed required debt payments.

- *Cash/revenue.* Government cash and securities outside of trusts as a percent of total own-source revenue. The more cash on hand, the less likely a government would be pressed to issue a POB.
- *Carry deficit.* States where it is possible to carry deficits from one year to another are likely to be in more fiscal stress than those states with a strict balanced budget requirement.

### Economic Environment

- *Unemployment rate.* The average unemployment rate by county over 2000-2007. The higher the unemployment rate, the more likely a government would be to issue a POB.

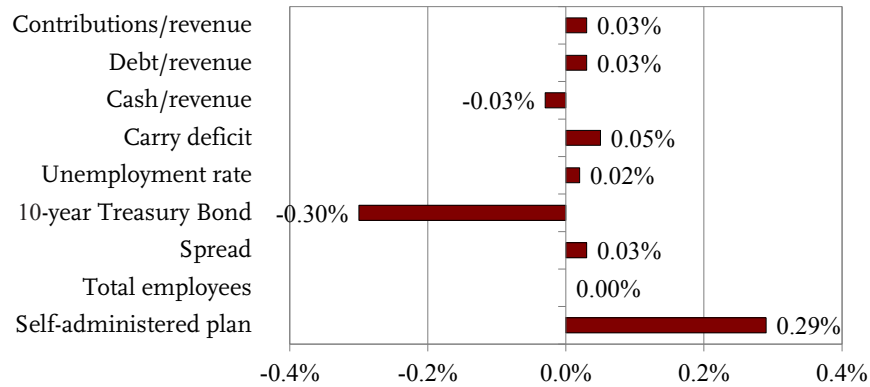
### Financial Conditions

- *10-Year Treasury Bond.* In times of low interest rates, localities would be more likely to issue POBs as their cost of borrowing would be lower.
- *Spread.* The difference between the actual investment returns that each retirement system experienced in the previous three years and the 10-year Treasury rate. The greater the spread, the more likely to issue a POB.

### Control Variables

- *Total Employees.* The expected outcome is that larger localities would be more likely to issue a POB as they could spread the transaction cost over a larger base.
- *Self-Administered Plan.* The Census identifies governments that administer their own pension plan. This variable could be positively related to issuing a POB because POBs are generally issued by governments in order to shore up the unfunded liabilities of their own plan. On the other hand, local governments that participate in state plans have less flexibility regarding required contributions demanded by the plan, and may issue a POB when unable to make payments.
- *Individual years.* Year dummies were included to control for changes in the health of the national economy.

FIGURE 5. FACTORS AFFECTING THE PROBABILITY OF GOVERNMENT ISSUING A PENSION OBLIGATION BOND, 1992–2013



Note: All results are statistically significant at least at the 95 percent level. For dummy variables, the effects illustrated reflect a shift from 0 to 1. In the case of continuous variables, the effects illustrated reflect a one-standard-deviation change across the mean in one variable while holding the others at their mean (see Appendix Table A1). For detailed regression results, see Appendix Table A2.<sup>19</sup>

Sources: Authors' calculations based on government financial data and retirement plan data from the U.S. Census Bureau (2011, 2012a, and 2012b); POB data from Bloomberg Online Service (2012); SDC Thomson Reuters (2013); and the St. Louis Federal Reserve (2014).

The results show that governments are more likely to issue POBs if the plan represents a substantial obligation to the government, they have substantial debt outstanding, and they are short of cash (see Figure 5). That is, financial pressures play a major role. Additionally, governments are more likely to issue a POB if they are in a relatively high unemployment state. Sponsors also appear to respond to financial conditions, being more likely to issue a POB when interest rates are low and the spread is high. Finally, governments that administer their own plan are much more likely to issue POBs than those participating in a state plan. While the magnitudes of the effects appear small, they are meaningful given that only 0.2 percent of governments in our sample issued a POB.

## CONCLUSION

When plan sponsors issue a pension obligation bond, the bond proceeds are invested with pension plan assets. The question then is whether the government will earn more on the proceeds than it will have to pay in interest. Immediately after the financial crisis, governments appeared to have lost money on their POBs.

Four years of economic recovery have improved the performance of POBs; today these bonds have netted 1.5 percent. But the story is far from over since many of these bonds have a 30-year life. And, because POBs turn a somewhat flexible commitment into a firm commitment, governments that have issued a POB have reduced their financial flexibility.

The second finding from this update – which includes a greatly expanded number of POB issuers – is that financial pressures continue to play a major role in the issuance of these securities. But the transaction also contains an element of investment speculation in that the spread – based on the plan's historical returns and current interest rate – is also positively related to the probability of issuing a POB. POBs could potentially be used responsibly by fiscally sound governments who understand the risks involved or could play a role as part of a broader pension reform package for fiscally stressed governments. But the results from this *brief* suggest that POB usage to date has not followed this formula – think Detroit, which issued POBs in 2005 and 2006 just as the market was approaching a peak.

## ENDNOTES

- 1 Munnell et al. (2010).
- 2 Scanlan and Lyon (2006).
- 3 The decrease in borrowing costs in issuing tax-exempt state and municipal POBs often exceeds the differential in the risk premium of state and local bonds over federal bonds of the same duration.
- 4 See Peng (2004).
- 5 Bader and Gold (2003).
- 6 Thad Calabrese generated the POB data set from raw data on government bond issues from Bloomberg.
- 7 States with less than \$1 billion in POB issuances are not shown in the figure.
- 8 California and Illinois are, of course, large states. On a per-capita basis, the biggest players are Oregon, Illinois, and Connecticut. California is number six.
- 9 Burnham (2003); Davis (2006); and Calabrese (2009).
- 10 Burnham (2003); Davis (2006); Calabrese (2009); Block and Prunty (2008); and Hitchcock and Prunty (2009).
- 11 Timing risk could be mitigated if the POB proceeds were applied more strategically, for example for purposes of matching retiree liabilities. This approach would be contrary to the principal of performance arbitrage but, in addition to avoiding timing risk, it would also reduce plan leverage and possibly improve funding.
- 12 Hitchcock and Prunty (2009).
- 13 Government Finance Officers Association (2005). The political risk of unnecessary benefit increases can be mitigated by legislatures and boards building in governance protections. For example, benefit increases could be prohibited until funding exceeds 115-125 percent.
- 14 A data set containing only non-federal pension financing bonds issued from 1992-2009 was drawn from municipal bond data from Bloomberg Online Service. This data set was combined with data on POB issuances from 1986-2013 from SDC Thomson Reuters.
- 15 A recent report by The PFM Group (2014) on the use of POBs states that they “should be considered only in conjunction with refining the ongoing benefit structure and investment policy of the fund or trust in order to position the issuer and employees for future sustainability.” The report goes on to say that issuers who wish to take advantage of the appropriate window to issue a POB should lay the groundwork early by preparing legal documents and considering the size and structure of the issuance in advance.
- 16 Of the 270 POB occurrences used in the regression analysis, 157 come from jurisdictions that do not administer their own plan.
- 17 We apportion the pension finances of state plans to these localities according to the ratio of the locality’s payroll to the total payroll of all localities in the same state that also do not administer their own plan. If the state-administered plan is employee-specific (i.e. a police and fire plan, or a teachers plan), then we apportion based on the ratio of the locality’s payroll for that employee type to the total payroll for that employee type.
- 18 In addition to the variables described, it would also be useful to include the funding status of the plan. Presumably, poorly funded plans would be more likely to issue a POB. Unfortunately, historical funding data are not available for most plans in the sample.
- 19 Census data regarding state and local government and pension finances are only available up to fiscal years 2011 and 2012, respectively. For the regression, the most recent Census data – 2011 for government finances and 2012 for pension finances – were duplicated and used for 2012 and 2013. Limiting the regression to only years with Census data does not change the results.

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# APPENDIX

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TABLE A1. SUMMARY STATISTICS OF FACTORS AFFECTING THE PROBABILITY OF GOVERNMENT ISSUING A PENSION OBLIGATION BOND, 1992-2013

Variable	Mean	Standard deviation	Maximum	Minimum
Contributions/revenue	1.87	2.79	0	21.09
Debt/revenue	4.34	5.65	0	36.82
Cash/revenue	99.35	87.34	4.30	717.90
Carry deficit	0.20	0.40	0	1
Unemployment rate	5.18	1.13	2.53	7.58
10-year Treasury Bond	4.99	1.07	1.80	7.01
Spread	2.18	9.00	-33.97	26.94
Total employees	1,148	8,762	0	405,810
Self-administered plan	0.09	0.28	0	1

Source: Authors' calculations.

TABLE A2. MARGINAL IMPACT OF FACTORS AFFECTING THE PROBABILITY OF GOVERNMENT ISSUING A PENSION OBLIGATION BOND, 1992-2013

Variable	Marginal effects
Contributions/revenue	0.00027 *** (0.000)
Debt/revenue	0.00030 *** (0.000)
Cash/revenue	-0.00030 *** (0.000)
Carry deficit	0.00050 ** (0.041)
Unemployment rate	0.00018 *** (0.008)
10-year Treasury Bond	-0.00203 *** (0.000)
Spread	0.00027 *** (0.000)
Total employees	0.00005 ** (0.025)
Self-administered plan	0.00286 *** (0.000)
Pseudo R <sup>2</sup>	0.1396
Number of observations	139,323

Note: Standard errors are in parentheses and adjusted for within-plan correlation. The model includes year fixed effects. The coefficients report marginal effects from a probit estimation computed at sample means of the independent variables and are significant at the 95 percent (\*\*\*) or 99 percent (\*\*) level. The dependent variable is 1 for governments that issued a POB in a given year, and 0 otherwise. *Source:* Authors' calculations.

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