Persistence
Pays Off

How a decade of risk-aware reserves management has benefited the City of Sharonville, Ohio

BY SHAYNE KAVANAGH AND SCOTT MCKEEHAN

Managing fund balance is a concern for governments of all sizes, and the City of Sharonville, Ohio, is no different. What does make Sharonville distinct from many other local governments is its fully "risk aware" approach to reserves, which it has practiced since 2014. In this article we'll see how that approach to risk has served Sharonville and how the city has adapted its reserve strategy to its changing risk profile over nearly a decade.

First, though, what is a "risk aware" approach to reserves? A reserve is a budget and policy tool that describes the fungible resources available outside of the budget that the government can use if the resources appropriated inside of the budget are insufficient. Put another way, the reserve is insurance against unplanned, unavoidable costs or revenue losses that can't be absorbed within the regular budget. Reserves are therefore a risk management tool, and that tool is more effective when it is managed based on the risks that a reserve may be needed for.

The City of Sharonville's journey to a risk-aware approach began with the 2008 Great Recession, which put significant stress on the city's reserves. Many tough budget decisions were made, including cutting programs and cutting positions as staff retired or left voluntarily. The experience made city officials realize the importance of a structurally balanced budget.

The city's budget began to recover by 2012, allowing suspended services and vacated positions to be restored. By 2014, reserves had fully recovered and grown beyond pre-recession levels.

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It became evident, however, that city officials didn't have a shared vision about the amount of reserves the city needed, or why. This posed a new source of financial risk: unwise use of a growing reserve.

A 2013 report about the risks faced by the City of Colorado Springs, Colorado, came to the attention of Sharonville city officials, and it included a recommended reserve range to be prepared for those risks.[1] A major risk faced by Colorado

Springs was the fluctuation of sales tax and the large proportion of overall revenue sales tax represented. Sharonville faced a similar risk with its municipal income tax,[2] which is vulnerable to recessions and makes up a large part of the city's revenue. In fact, the State of Ohio had reduced or eliminated several other sources of revenue that support local governments, which had increased the income tax's share of total city revenue from around 80 to nearly 90 percent.

Sharonville had a risk analysis conducted in 2014, cataloging and analyzing the following risks:

- In addition to the risks posed by the income tax, the city's other revenues were not very stable. Exhibit 1 shows the sources of Sharonville's annual revenues from 2006 to 2013, along with the proportion of overall revenue represented by taxes. The impact of the Great Recession can be seen in the fluctuation of revenue, during which time the city's budget was down around 14 percent and there was a decline in the percentage of the city's revenue represented by taxes.

- A Ford automobile plant is the city's major employer, so a large portion of the city's income tax revenue comes from taxes paid by the Ford Motor company and its employees. If the plant were to shut down, the city would have a big hole in its budget. Exhibit 2 shows the concentration of employment in Sharonville in 2011. The area of largest concentration is the location of the plant.

- The city's labor contracts required payouts for accumulated sick leave. A large cohort of firefighters was projected to retire over the next 16 years, which created a risk of expenditure volatility. Some of these employees had accumulated large unspent balances.

- The city was at risk of extreme events such as flooding, rail accidents, and tornados.
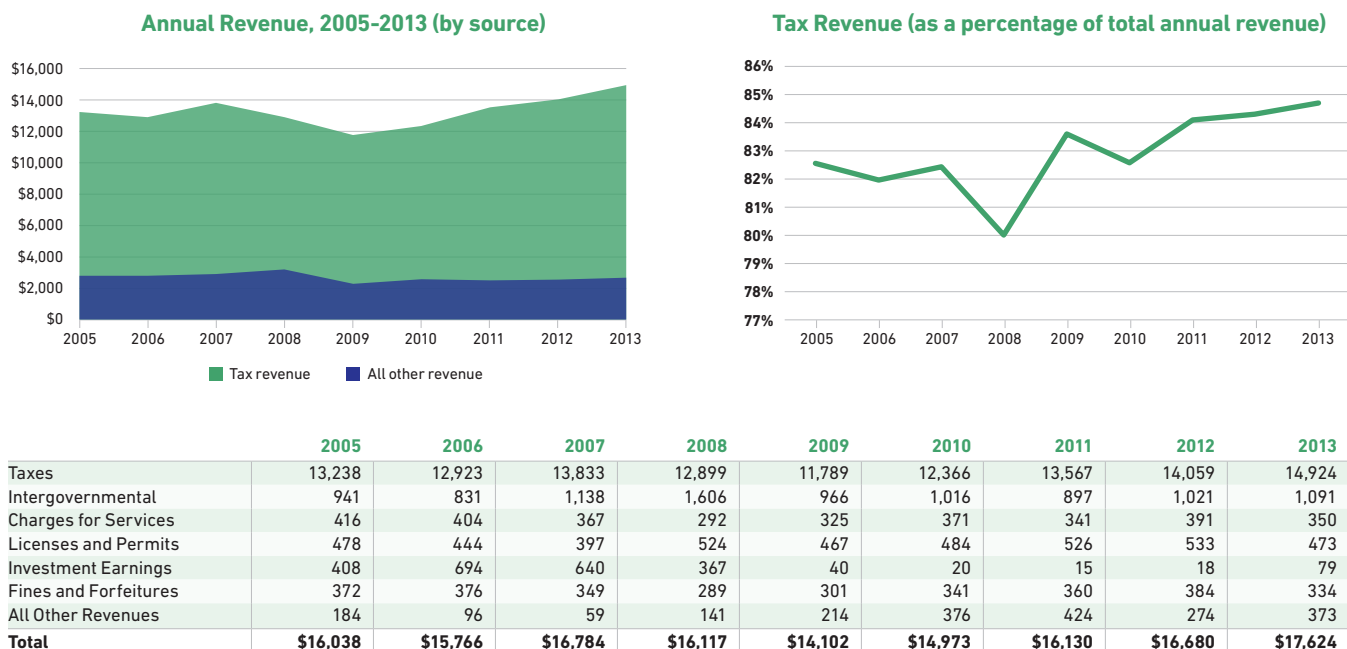
The 2014 analysis suggested the city select a reserve target for its general fund between $7.2 million and $9.2 million. (The details of how this analysis was performed are included in the full report, available at gfoa.org/risk-analysis.) The study provided city officials with a unified expectation and goal for the size of the city's reserves. It also helped set the stage for several practical benefits of a stronger reserve management strategy and policy.

First, there was Sharonville's growing liability for sick leave separation benefits. With a large portion of the city's police and fire staff coming on board during the 1990s, the projected separation benefits for the next decade were a mounting burden. Via negotiations with bargaining units, a policy change was made to significantly reduce the amount of unused sick leave paid out at retirement for new hires.

Second, the city identified a ceiling amount on desired reserves. As a result, when a strong economy helped Sharonville replenish its fund balance sooner than expected, and then exceed the ceiling amount, the city had already established a policy for year-end set-asides from resources above the reserve ceiling. The risk analysis highlighted the importance of using excess reserves for nonrecurring costs, so the city directed that money toward paying existing debt and funding capital projects.

EXHIBIT 1 | GENERAL FUND REVENUES (IN THOUSANDS OF DOLLARS)

Annual Revenue, 2005–2013 (by source)

Tax Revenue (as a percentage of total annual revenue)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Taxes	13,238	12,923	13,833	12,899	11,789	12,366	13,567	14,059	14,924
Intergovernmental	941	831	1,138	1,606	966	1,016	897	1,021	1,091
Charges for Services	416	404	367	292	325	371	341	391	350
Licenses and Permits	478	444	397	524	467	484	526	533	473
Investment Earnings	408	694	640	367	40	20	15	18	79
Fines and Forfeitures	372	376	349	289	301	341	360	384	334
All Other Revenues	184	96	59	141	214	376	424	274	373
Total	**$16,038**	**$15,766**	**$16,784**	**$16,117**	**$14,102**	**$14,973**	**$16,130**	**$16,680**	**$17,624**

Third, Sharonville was able to leverage its reserves to self-finance and capital projects and save interest costs. Back in 2014, there was a backlog of street maintenance, a longstanding desire to construct a new police station, and a handful of necessary roadway improvements and connectivity projects. The city has since accomplished many of these projects sooner than expected and without any long-term financing, and it only had to issue a minimal amount of debt to help finance a portion of the new police station (and that debt has since been retired). Sharonville has also been able to initiate other new projects sooner and at lower costs than would have been possible if it were completely dependent on outside financing. For example, the city is now working on a multimillion-dollar project to convert a culvert into a bridge, which will reduce flooding. This project is primarily funded by reimbursable grants. Having healthy reserves gave the city more assurance in taking on this project more easily, confident it can cover construction costs while awaiting grant reimbursement.

Two of the practical benefits highlighted above contributed to lowering the city's risk profile, as well. The change in benefits payout policy reduces expenditure volatility, and the flooding project reduces catastrophic risk exposure.

In 2021, as Sharonville took stock of these accomplishments and began making a new five-year capital plan, city officials realized that that the results of the 2014 analysis were quickly aging and that the old fund balance goals may no longer be relevant to the evolving risks facing the city. Here are three examples of new or evolving risks:

- COVID-19 had shown that the city could be vulnerable to declines in its hotel tax revenues, which were used to help finance a local convention center. If hotel taxes came up short, the general fund would be on the hook.

- Trains carrying hazardous materials pass through Sharonville—an example of an extremely low-probability risk with potentially extreme consequences if it were to happen. Though the East Palestine,

Ohio, train derailment took place in 2023, which was after this analysis, it shows the potential damage of a large spill.

- Cyber security risks have become salient for all local governments. Though Sharonville has a cyber insurance policy, the city is still responsible for any deductibles or damages that exceed policy limits.

The city did a new analysis of these risks and of existing ones like income tax vulnerability, employee sick leave balances, and the risk of the Ford plant closing. And just as the city's risk profile has evolved since 2014, so has the approach taken to risk analysis.

The 2014 project used single numbers to represent the potential impact of risks—for example, looking back at past recessions to determine the losses incurred. In Sharonville's general fund, the largest annual decrease in

the city's revenues was in 2009, down 12.5 percent from 2008. But a historical reference point, like 2009, cannot be assumed to represent the "worst case." A risk analysis must consider worse possible outcomes. At the same time, if the city experiences a decrease in revenues, it should respond by reducing its budget instead of relying on reserves to cover the entire amount of the reduction. Taking these considerations into account produced a reserve amount of $2.3 million for recession risk. Each risk was analyzed in a similar fashion, relying on Sharonville's historical experience or on the experiences of comparable municipalities. This single-number approach is straightforward, but it has an important disadvantage. "Risks" are uncertain quantities, and representing uncertainties as single numbers obscures the full range of risk the city faces.[3]

**EXHIBIT 2 | CONCENTRATION OF EMPLOYMENT, 2011**
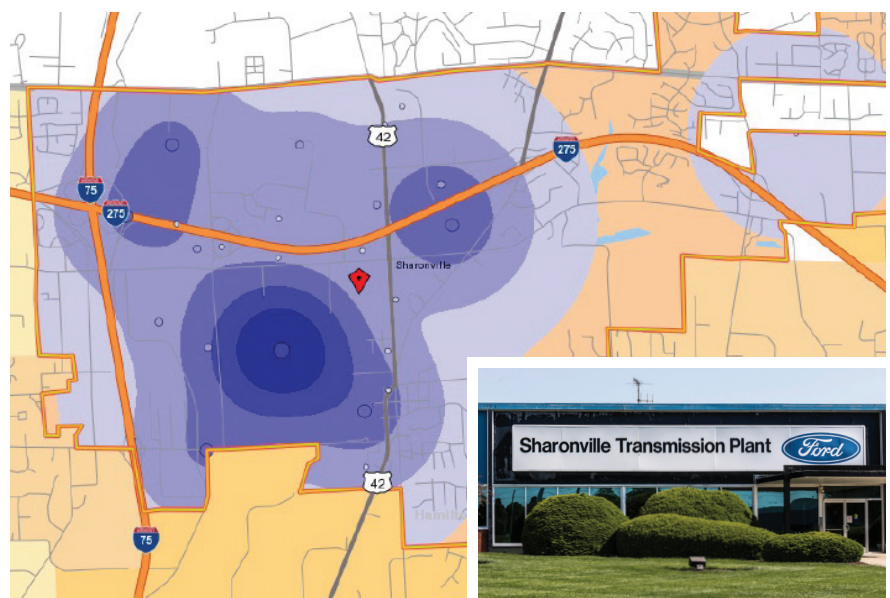
Increasingly dark areas of purple indicate where employment is concentrated. Sharonville has one area of primary concentration, where Ford Motor company's Sharonville Transmission Plant employs approximately 2,000 people.

▪ 5–397 jobs/sq. mile	• 1–5 jobs
▪ 398–1,574 jobs/sq. mile	• 6–78 jobs
▪ 1,575–3,535 jobs/sq. mile	● 79–392 jobs
▪ 3,536–6,282 jobs/sq. mile	● 393–1,238 jobs
▪ 6,283–9,813 jobs/sq. mile	● 1,239–3,022 jobs

Source: U.S. Census Bureau

EXHIBIT 3 | **CUMULATIVE PROBABILITY CHART**

In **10 years**, how confident can the city be that the existing general fund reserve will be enough?
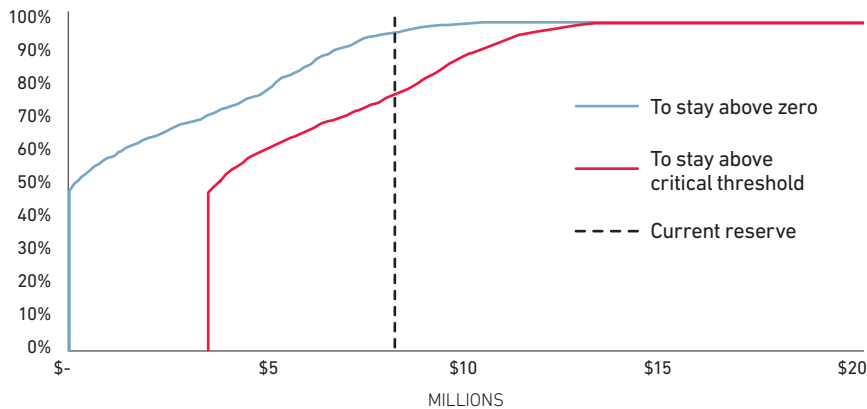
To overcome the disadvantages of the single method, we must evaluate the full range of risk, rather than condensing risk down to a single number. This method is called "chance-based" because we can use the full range of risk to determine the chance that any given reserve level will be adequate to protect against the risks in question.

The chance-based method allowed for a more nuanced look at the risks. We can illustrate with the closure of a major employer. The 2014 report considered only a binary condition where the major employer was either closed or operating at full capacity. The chance-based model considered a range of in-between states (such as, curtailment of production, but not complete closure) and adjusted the risk over different time periods (five years in the future versus ten years in the future), based on data collected about the useful life of the plant. Similar nuance was added for all the risks analyzed.

The chance-based model also allowed for a better examination of risks like a train derailment. A derailment that results in a major spill has a very low chance of occurring, but it would have catastrophic consequences if it did. The single-number method of risk analysis does not address these types of risks well, but chance-based methods are perfectly suited for them. The chance-based method can show a range of different possible outcomes and the chance that the city would be able to financially cope with that outcome.[4]

Exhibit 3 shows one of the outputs from the chance-based method. This "cumulative probability chart" shows the chance that any given level of reserves would be sufficient over ten years to satisfy either of two conditions:

1. The blue line shows the chance reserves will stay above zero, given the city's exposure to all the risks analyzed.

2. The red line shows the chance that reserves will stay above a "critical threshold" amount, which is the non-zero amount of reserves the city would prefer to stay above. It was set at $3.5 million, based on rating agency expectations for preserving the city's bond rating, among other considerations.

Exhibit 3 shows that the city's reserve in 2021 was sufficient for 75 percent confidence to stay above the critical threshold.

The exhibit also shows that reserves have a diminishing return at a certain point because the flatter the line gets, the less confidence an additional dollar of reserve "buys." This is because the further to the right you go on the graph, the more extreme the events are that must be covered by reserves. This graphic shows that the city would still get a good "bang for the buck" from higher reserves, given the size of its existing reserve. This city would not be served as well by accumulating reserves past the point where the line starts to flatten out because more reserves do not move the city up as far

on the vertical axis, which represents the chance that the city's reserves will be sufficient to cover losses.

Neither the blue nor red line ever reaches 100 percent confidence, instead extending to the right quite a bit before crossing the right side of the graph. This represents extremely rare but extremely consequential outcomes, like a severe train derailment. Less severe train derailments are included in the parts of the line that are to the left and lower down.

Ultimately, Sharonville decided that it would benefit from a slightly higher reserve target.[5] Though the city was facing more risk in some areas (as in, hotel taxes), it was also facing less risk in other areas—employee sick leave liability had become more manageable, for example. The new reserve target for the general fund was $8.5 million to $11 million, which was sufficient to give the city 80 to 95 percent confidence of being able to address the risks in the analysis over the next ten years.

Finally, the new analysis produced a computer simulation that allows the city to update important variables and produce refreshed analysis as the circumstances change.[6] Given the ever-evolving nature and costs of cyber risks, manufacturing labor changes, and transportation-related environmental incidents, the city can better prepare to have sufficient reserves and insurance coverage and remain risk-aware in the years going forward. ▣

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[1] "A Risk-Based Analysis of General Fund Reserve Requirements: A Case Study of the City of Colorado Springs" (available at gfoa.org).

[2] Ohio is unique in that municipal income tax is a significant source of revenue for municipal governments across the state.

[3] Readers who are interested in a fuller explanation of the consequences of obscuring the full range of risk are invited to read the GFOA report, "Should We Rethink Reserves?" (at gfoa.org), which also includes explanatory videos. In short, the primary consequence is that not understanding the full range of risk makes it impossible to truly optimize the total amount of reserves a government should seek to maintain.

[4] Readers who are interested in reading more about the analysis are invited to read the full report produced for Sharonville at gfoa.org/risk-analysis.

[5] The 2014 analysis produced a range of $7.7 million and $10.1 million, in 2022 dollars.

[6] A short video explanations of the advantages of computer simulation for risk analysis is available at gfoa.org/risk-savvy-thinking-about-reserves-videos.