CommunityScale

Metropolitan Council
Regional Housing Nexus Study

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About CommunityScale
CommunityScale LLC is an urban planning consultancy that specializes in supporting communities nationwide to enhance equity, economic mobility, and housing attainability. Our services include development opportunity assessments, regulatory and zoning reviews, and housing needs assessments. We help our clients make informed, data-driven decisions on policy and investment strategies.

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01 | INTRODUCTION

Study goal

This region-wide housing nexus study helps cities adopt and update local inclusionary housing ordinances (IHOs) or other impact fee programs to advance regional affordable housing goals. This study leads into a subsequent effort to build an interactive tool that will allow cities and townships to engage with housing assessment and nexus study data directly. In this context, the nexus means a rational connection between the fees imposed on a development project and the impacts of that project.

What are local inclusionary housing ordinances (IHOs)? Inclusionary Housing Ordinances (IHOs) are a regulatory tool through which municipalities require that a percentage of units in new market-rate housing developments be affordable to lower-income households. The below-market units are funded through an internal cross-subsidy from the market-rate units in the same project. For example, a typical inclusionary zoning ordinance might require that ten percent of the units in all new developments of ten units or more be affordable to households making 60% or less of area median income.

As of 2017, there were 886 jurisdictions implementing some form of inclusionary housing policy in 25 states and the District of Columbia. Most of these communities were in three states: California, Massachusetts and New Jersey, and many of these policies had been put in place since 2000 as reported by the Lincoln Institute.

Why do IHOs need a nexus study? Because IHOs impose a cost on private development, they must be grounded in a demonstrated causal relationship, or "nexus," between the construction of market-rate housing and the demand for affordable housing that it generates. A nexus study quantifies this relationship by tracing how new market-rate residents spend money on local goods and services, how that spending supports jobs across a range of industries, and how many of those workers earn wages too low to afford market-rate housing in the same community. The result is a per-unit estimate of affordable housing demand induced by new development, which helps establish the nexus ceiling for imposed requirements.

How will the results be used? This study provides the analytical foundation that municipalities need to adopt or update their own IHOs. Rather than prescribing specific ordinances, the study delivers a calculator tool that allows each community to engage with housing assessment and nexus study data directly, tailored to their local market conditions. Municipalities can use the tool to help determine the appropriate fee-in-lieu amount on a per-unit basis, evaluate economic feasibility under local conditions, and calibrate their inclusionary requirements accordingly.

The calculator can be updated as market conditions change. Key inputs, including rental rates, construction costs, interest rates, and wage data, can be refreshed periodically so that municipalities can recalibrate their policies without commissioning new studies. This is consistent with feedback from municipal staff, who identified the ability to support periodic policy review cycles without repeated consultant engagements as a high priority.

Methodology overview

This study establishes a calculation methodology that helps establish a rational nexus between market-rate residential construction and the demand for affordable housing it generates, providing an analytical foundation for inclusionary housing fees.

This calculator evaluates affordable housing requirements in two ways:

1. Within the established nexus: Require no more affordable housing than the maximum justifiable rate determined in the nexus analysis, and
2. Within economic feasibility: Require no more affordable housing than can be supported by the market as determined by the economic feasibility assessment

This two-part analytical structure helps provide a foundation for constitutional defensibility. The nexus analysis helps establish the legal ceiling by quantifying the causal relationship between development and affordable housing demand. The feasibility analysis helps establish the economic ceiling by determining what the market can absorb.

The recommended fee for any given municipality is the lesser of these two values, helping to ensure that the fee is both defensible and economically viable. By recommending the lesser of these two amounts, the methodology demonstrates that the fee is tailored to both the measured impact and the economic reality of development, rather than set at an arbitrary or punitive level.

The following sections provide detailed explanations of the nexus and financial feasibility methods.

Study process and timeline

CommunityScale's process...

- The initial coordination meeting with Met Council staff November 14, 2025
- Refinement of project scope completed on December 15, 2025
- The first workshop January 14, 2026
- Data collection and analysis completed on February 2026
- The second workshop March 17, 2026
- Draft report shared with Met Council staff on April XXth, 2026
- Final report completed on May XXth, 2026

02 | HOUSING NEEDS ASSESSMENT

This chapter summarizes the Metropolitan Council's framework for determining regional affordable housing needs and allocating that need to individual communities. The Met Council's housing needs methodology provides the policy context for this nexus study by establishing the scale and distribution of affordable housing demand that inclusionary housing ordinances and other local tools are intended to help address.

Regional affordable housing need

The Metropolitan Council forecasts future affordable housing needs using a regional economic model, then allocates a share of the overall need to communities expecting sewer-serviced household growth over the coming decade. The Imagine 2050 Regional Development Guide, adopted in 2025, establishes the housing policy framework for the next 30 years. The region is projected to grow by 650,300 residents by 2050, reaching a total population of approximately 3,813,400. A central finding of the Met Council's analysis is that a disproportionate share of future household growth will be among lower-income households. Approximately 42.2% of the region's projected growth will consist of low-income households as a baseline.

For the 2031-2040 planning decade, the Met Council projects a regional need of 39,700 new affordable housing units, including 21,150 units at the deeply affordable level (at or below 30% of Area Median Income). The region requires approximately 3,900 affordable units per year on average to keep pace with demand through 2040. Some of that need will be handled by subsidy and grant programs, with the remainder to be addressed through local tools including inclusionary housing policies.

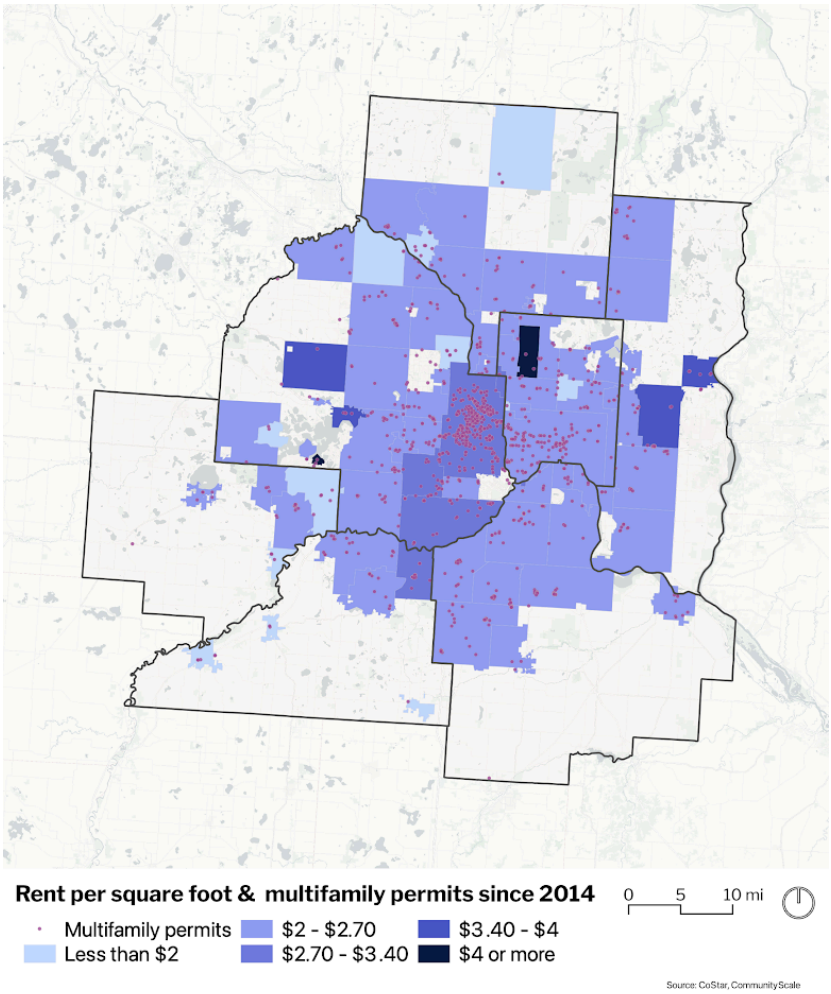
Allocation to communities

The Met Council's allocation methodology distributes the regional need to individual cities, townships, and unorganized territories (CTUs) based on three primary factors:

1. **Forecasted household growth**: Communities expecting more sewer-serviced household expansion receive higher allocations.
2. **Existing affordable housing stock**: Communities with less affordable housing relative to the regional average receive upward adjustments; those with more receive downward adjustments.
3. **Jobs-housing balance**: The ratio of low-wage jobs to low-wage-earning residents in each community influences the allocation, directing more need to areas where workers cannot afford to live near their employment.

The regional total is grounded in demographic and economic forecasts, while the community-level allocation incorporates policy objectives. The Met Council's allocation directs more affordable housing to communities, particularly suburbs, where little has been built to date. The resulting allocations demonstrate that many communities need 40% to 50% or more of new units at affordable levels.

Communities with an allocation of Future Need for 2031-2040 must report their allocation in their 2050 comprehensive plans, which are due by the end of 2028. Individual community allocations are available on the Met Council's Community Pages.



Rental housing market overview

Market-rate rents for new construction set the baseline for the nexus calculation. Higher rents imply higher-income residents, greater consumer spending, more induced employment, and a larger gap between market rents and what workers can afford.

The Twin Cities rental market provides the economic context for both the housing needs allocation and the nexus analysis that follows. Market-rate rents for new construction set the baseline for the nexus calculation (see Section 03), while the gap between those rents and what lower-income households can afford defines the scale of the affordability challenge.

The nexus calculator's default uses municipal-level CoStar data to establish a baseline expectation for the market-rate rent, selecting the 85th percentile of asking rents for market rate new construction.

This approach attempts to capture rents that newly built apartments would command, rather than the average across older and newer inventory. However, there are several factors that make CoStar an imperfect analog: filtering for recent construction (post-2020) is not a perfect analog for what rents would be required to build new market rate rental multifamily today, as those rents reflect a different environment, and while CoStar does filter out affordable housing, it does not indicate whether public subsidies went into making a multifamily development happen (TIF, tax abatement, public land use, etc). For the purpose of a nexus study, the calculation is only interested in purely market-supported units for units that are just being planned and permitted today under the current economic conditions, so subsidies like this that could enable lower rents somewhat distort the market rate average.

Therefore, municipalities can consider the CoStar rents as a baseline, but to be complete should conduct stakeholder and developer interviews to determine what rents are likely to be within upcoming and planned developments. In general, rents vary significantly across the region. Submarkets in Minneapolis, St. Paul, and first-ring suburbs with strong transit access and employment centers tend to command higher rents (see the Rent per square foot map). These differences drive variation in the nexus fee from community to community.

Rental housing market affordability

The standard measure of housing affordability is the 30% threshold: a household is considered cost-burdened when housing costs exceed 30% of gross income. Using the latest HUD Income Limits at the time of writing (2025), for a household earning 60% of AMI ($74,520 for a family of four, typically 2-3 bedrooms), the maximum affordable monthly rent is approximately $1,863. For a household at 30% AMI ($37,250), the maximum affordable rent drops to approximately $931 per month.

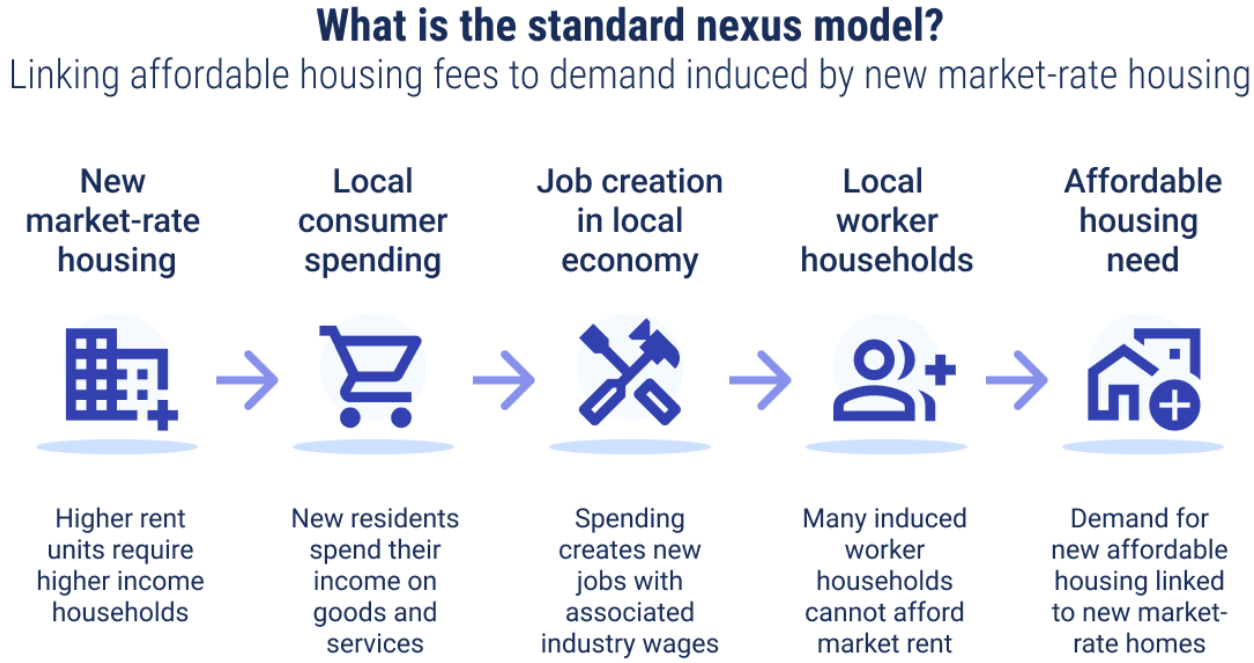
As described later in the methodology section, Minnesota Housing's cost prediction model reports per-unit expected total development costs for urban (Minneapolis/St. Paul) and suburban locations. According to these MN Housing estimates for suburban communities, the breakeven rent according to this study's model is $2,664/month ($3.33/SF). This rent is affordable to a household earning $106,571 per year. An annual household income of $106,571 is just above 80% AMI for the region, whereas the allocated affordable housing need is all below 80% AMI (including <30% AMI, 31-50% AMI, and 51-80% AMI groups). Note that the Met Council considers 60% AMI or less to be the income limit for affordable multifamily rental housing.

An Inclusionary Housing Ordinance (IHO) requires developers to rent a share of new apartments at below-market rates, with the revenue shortfall cross-subsidized by the remaining market-rate units. For this internal subsidy to work, a project's market-rate rents must be high enough above its breakeven point (the rent needed to meet the 6.25% yield on cost that investors require before committing capital) to absorb the forgone income from the restricted units. Based on Minnesota Housing's cost estimates for suburban communities, the breakeven rent for a new multifamily project with no IHO is $2,664/month ($3.33/SF), affordable to a household just above 80% AMI.

Testing an IHO scenario with 10% of units income-restricted to 50% AMI, the required market-rate rent rises to $2,861/month ($3.98/SF, see map on preceding page for rents by municipality from CoStar), affordable to a household earning $114,440/year, or about 86% AMI. Higher set-aside ratios or deeper affordability targets would push the required market-rate rents higher still. If those rents exceed what the local market supports, the project becomes infeasible and no housing gets built (market-rate or affordable) which is why calibrating IHO requirements to local conditions is essential.

Note that rents should be above this rate to support IHO and still achieve the target yield-on-cost of 6.25% for multifamily development. Testing an IHO scenario with 10% of units income-restricted to 50% AMI, the required rent for market rate goes up to $2,861/month ($3.98/SF, see map on preceding page for rents by municipality from CoStar). This rent is affordable to a household earning $114,440 per year, which is about 86% AMI for the region. Higher ratios of affordable housing and/or deeper affordability requirements will increase the rents required to cross-subsidize the income-restricted IHO apartments.

03 | NEXUS ANALYSIS FOR NEW HOUSING



Expenditure-Employment-Housing Linkage Chain (Standard Nexus Model)

This methodology traces a chain of economic linkages. New market-rate households spend money on goods and services, those expenditures support jobs across a range of industries, and many of those workers earn wages that are insufficient to afford market-rate housing in the same community. The result is a quantified, per-unit estimate of the affordable housing demand induced by each new market-rate unit built.

This study uses the following standard economic model to establish a nexus between market-rate development and affordable housing needs is the expenditure-employment-housing linkage chain. The expenditure-employment-housing linkage establishes the need for affordable housing units based on the connection between new households added and the demand for housing their spending on goods and services generates. The chain works as follows:

1. Household income estimation: New market-rate housing occupants' income is estimated based on the rent of prototypical units.
2. Consumer expenditure modeling: Using Bureau of Labor Statistics Consumer Expenditure Survey data, the model estimates how much those households spend on goods and services by category (food, retail, entertainment, etc.).
3. Employment generation: The household spending data is linked directly to specific NAICS industries using U.S. Census Economic Census data, which provides receipts-to-wages ratios that convert consumer spending into the wages generated in each industry.

4. Wage distribution analysis: Using Bureau of Labor Statistics occupational employment data and local wage data from state employment agencies, the model determines what share of newly created jobs pay wages too low for workers to afford market-rate housing.
5. Affordability gap calculation: The gap between affordable housing costs for lower-income worker households and actual market-rate costs establishes the maximum justified fee.

Step-by-Step Methodology

The nexus calculation proceeds through the following steps, each labeled to correspond to the calculator workbook.

Step [a]: Establish the Market-Rate Rental Rate

The analysis begins with a new construction rental rate per unit per month, drawn from CoStar market data for the selected municipality. For each community, the calculator retrieves asking rent per square foot across multiple unit types (studio, one-bedroom, two-bedroom, etc.) and selects the 85th percentile of asking rents, then takes the maximum value across all unit subtypes. This approach captures the top of the local market, reflecting the rents that newly built apartments would command.

The entire nexus calculation is highly sensitive to the market-rate rent input, because rent determines the assumed household income of new residents, which in turn drives all downstream expenditure, employment, and affordability calculations. *Small changes in the rent assumption can produce significant changes in the resulting nexus fee.*

The calculator also provides a rent override option because CoStar data reflects existing inventory and may not capture the rents that new construction will command. If a municipality expects market-rate rents for projects currently being permitted to exceed the CoStar baseline, the user can enter an override value. The calculator then provides the option to use either the CoStar-derived rent or the override, and the nexus results adjust accordingly. In communities with higher override rents, the nexus fee increases because the model captures affordable housing demand at additional AMI levels (e.g., up to 100% or 120% AMI) that would not be triggered at lower baseline rents.

Step [b]: Determine Required Household Income

The required household income for a market-rate renter is derived from the standard affordability threshold: housing costs should not exceed 30% of gross household income. The market-rate rent (annualized) is divided by 0.30 to yield the minimum household income required to rent a new market-rate unit without being cost-burdened.

Step [c]: Identify Household Spending Patterns by Income Category

Using the Bureau of Labor Statistics Consumer Expenditure Survey (CES) Table 1203, the model identifies the spending pattern for the income bracket that corresponds to the required household income from Step [b]. The CES reports the percentage of income spent on each major consumer expenditure category (food at home, food away from home, housing operations, apparel, transportation, healthcare, entertainment, personal care, reading, education, tobacco, and miscellaneous expenditures). The calculator uses a FILTER function to select the correct income bracket column from Table 1203 based on the household income derived in Step [b].

Step [d]: Calculate Total Expenditures per Industry per 100 Households

Each CES expenditure category is allocated to one or more specific NAICS industry codes based on the types of businesses that would receive those household expenditures. For example, "Food at home" spending is allocated across Grocery Stores (NAICS 4451, 60%), Specialty Food Stores (NAICS 4452, 20%), Mobile Food Services (NAICS 72233, 10%), and Other Specialty Food Stores (NAICS 44529, 10%). Each allocation percentage reflects the estimated share of that expenditure category flowing to each industry.

The total expenditure per industry per 100 market-rate households is calculated as:

> **[d] = [b] x [c] x 100**
> (Household income x allocated spending share x 100 households)

The allocation of expenditure categories to specific industries is based on professional judgment informed by NAICS industry classification standards and the structure of consumer markets. While no single published dataset provides exact allocation percentages at this level of specificity, the allocations are conservative and internally consistent with NAICS industry definitions. These allocations should be documented in the final study report, including the rationale for each split, to ensure transparency and support the administrative record.

Step [e]: Convert Expenditures to Wages Using the Economic Census

The U.S. Census Bureau's 2022 Economic Census (EC22, dataset "EC2200BASIC") provides the ratio of gross receipts (revenue) to annual payroll for each NAICS industry. This ratio represents how much of every dollar of revenue in a given industry goes toward worker wages. The model looks up each NAICS code's receipts-to-wages ratio from the EC22 data.

Step [f]: Estimate Total Wages by Industry

Total wages resulting from market-rate household spending in each industry are calculated as:

> **[f] = [d] / [e]**
> (Total expenditures / gross receipts-to-wages ratio)

This converts the dollar volume of household spending into the total wages generated in each industry by 100 market-rate households.

Step [g]: Determine Average Industry Wages

Average annual wages per worker in each NAICS industry are drawn from the Minnesota Department of Employment and Economic Development (DEED) Quarterly Census of Employment and Wages (QCEW) for the 7-county Twin Cities planning area. This provides locally grounded wage data rather than national averages.

Step [h]: Calculate Total Workers Generated

The number of workers required to provide goods and services to 100 market-rate households is calculated for each industry:

> **[h] = [f] / [g]**

(Total wages generated / average wage per worker)

Steps [i] through [k]: Classify Workers into Household Types

Workers are classified into single-earner and multi-earner households using data from the American Community Survey (ACS tables B23025 and B11001 for the Minneapolis-St. Paul MSA). This approach is used instead of simply dividing by the average number of workers per household, because averaging across all household types would smooth out the concentration of lower-income workers in single-earner households, understating the affordable housing demand generated at the lowest income levels. By treating single-earner and multi-earner households separately, the model preserves the full distribution of worker household incomes.

The proportion of single- versus multi-earner households varies by income level, with lower-wage workers substantially more likely to be in single-earner households. As seen in the Workers in single- earner households (%) and Workers in multi-earner households (%) columns (MaxNexusFee tab), approximately 80% of workers earning less than $39,000 are in single-earner households. For multi-earner households, the average number of workers per household (typically 2.2, scaling up to 2.4 for middle-income households) is applied to estimate household income:

[i] = Workers in single-earner households (proportion varies by income level)
[j] = Workers in multi-earner households
[m] = Matrix of Avg. workers per household in multi- worker households per income group
[k] = [g] x [i] x [m] = Multi-earner worker household income

Step [l]: Aggregate Demand by AMI Category

Worker households are sorted into HUD-defined income categories based on the Area Median Family Income (AMI) for the Minneapolis-St. Paul-Bloomington HUD Metro FMR Area. The income categories used are:

Category	Income Range
Extremely Low Income	0 - 30% AMI
Very Low Income	30% - 50% AMI
60% AMI	50% - 60% AMI
Low Income	60% - 80% AMI
Median Income	80% - 100% AMI
Moderate Income	100% - 120% AMI
Middle Income	120% - 150% AMI

Only income categories where the maximum affordable rent is below the market-rate rent contribute to the nexus demand total. For example, if the market-rate rent for a given community falls within the 80% AMI affordability range, then households at 80% AMI and above are excluded from the demand count because those households could already afford market-rate housing. In that case, only the 0-30%, 30-50%, and 50-60% AMI categories would be included. This filtering ensures that the nexus fee reflects only the affordable housing demand that is genuinely induced by the gap between market rents and what

lower-income worker households can afford. The total demand is summed across the included categories, yielding the total number of affordable units needed per 100 market-rate units built.

Maximum Justifiable Nexus Fee Calculation

The financing gap per affordable unit is calculated by comparing the market-rate rent to the maximum rent affordable at each income level (30% of income / 12 months). The difference is the monthly "rent gap." This rent gap is annualized and capitalized at the prevailing market cap rate (from CoStar) to estimate the subsidy required per affordable unit. The maximum justifiable fee per market-rate unit is then:

> **Fee per market-rate unit = (Subsidy per affordable unit x Units needed per 100 market-rate units) / 100**

This fee is summed across all income categories to yield the total maximum supportable nexus-based housing fee per market-rate unit.

Met Council Affordable Housing Allocation

The calculator also incorporates the Metropolitan Council's affordable housing allocation for each municipality from the CTU (Cities, Townships, and Unorganized Territories) dataset. This allocation specifies the projected growth in sewered housing units and the share of that growth that should be affordable at various income levels (<30% AMI, 31-50% AMI, 51-60% AMI). This provides a policy benchmark alongside the nexus-derived demand estimate.

Data Sources

Source	Description	Used For
BLS Consumer Expenditure Survey, Table 1203 (2023)	Household expenditure shares by income bracket	Spending patterns by income level [c]
U.S. Census Bureau Economic Census (2022)	Gross receipts and annual payroll by NAICS industry	Expenditure-to-wage conversion ratios [e]
MN DEED QCEW (7-county planning area)	Average annual wages by NAICS industry	Local industry wage levels [g]
ACS B23025/B11001 (Minneapolis-St. Paul MSA)	Employment status and household size	Single/multi-earner household classification [i]
HUD Income Limits (FY 2025)	Area Median Family Income and income category thresholds	AMI category definitions [l]
CoStar	New construction rental rates by submarket	Market-rate rent inputs [a]
Met Council CTU Allocations	Projected growth and affordable housing need by municipality	Policy-based affordable share benchmarks

04 | ECONOMIC FEASIBILITY ASSESSMENT

Overview

The financial feasibility analysis determines the maximum housing linkage fee or inclusionary requirement that new market-rate rental development can absorb without rendering projects financially infeasible. While the nexus calculation establishes the legal ceiling for a fee (the maximum justifiable amount based on induced demand), the feasibility analysis establishes the economic ceiling: the point beyond which additional fees would discourage development altogether.

The analysis uses a pro forma development model for a representative new multifamily rental project, calibrated to current Twin Cities market conditions. It calculates the project's yield on cost (YOC). YOC is the primary metric that developers and investors in the regional rental market use to evaluate whether a project "pencils," i.e., whether it generates sufficient return to justify construction, see the feasibility test below for more details. The analysis compares the modeled YOC to the minimum threshold required by investors and lenders. Any surplus in YOC above the minimum threshold represents the economic capacity to absorb additional costs, including inclusionary housing fees.

The final recommended fee is the lesser of the nexus-derived maximum (Part 1) and the economically feasible maximum (Part 2), ensuring that the fee is both legally defensible and economically viable.

Pro Forma Model Structure

The default feasibility model is built around a 200-unit multifamily rental project, a representative prototype for new construction in the Twin Cities metro. All of the values can be overwritten to represent a different development type while the proforma's calculation structure will remain intact. The model uses the following structure:

Unit Mix and Physical Assumptions

Parameter	Value
Total units	200 units
Studio (35%)	650 NSF
1-Bedroom (45%)	800 NSF
2-Bedroom (15%)	1,000 NSF
3-Bedroom (5%)	1,200 NSF
Weighted average unit size	~800 NSF
Common area adjustment	17%
Density	60 units/acre

Revenue Assumptions

Rental rates are drawn from CoStar data for new construction, upper-tier multifamily properties in each submarket. Rates are expressed per square foot per month and applied to the unit mix to generate potential gross income. The model applies industry-standard adjustments:

Parameter	Value	Source
Vacancy rate	5.0%	Industry standard (stabilized)
Collections loss	1.5%	Industry standard
Operating expense ratio	30% of effective gross income	Industry standard
Other income (storage, parking)	4% of potential gross income	Industry standard

The revenue metric is **Net Operating Income (NOI)**, defined as:

Net Operating Income (NOI) = Effective Gross Income - Operating Expenses + Other Income.

Development Cost Assumptions

The model offers three development cost scenarios:

1. Pro forma with editable values: A built-up cost estimate using line-item inputs for land, site preparation, parking, hard costs, permits/fees, soft costs, and financing. This allows detailed sensitivity analysis.
2. MN Housing predicted costs: Per-unit costs from Minnesota Housing's cost prediction model (2027 dollars), using the line item for projects without Low-Income Housing Tax Credit (LIHTC) financing, differentiated by urban (Minneapolis/St. Paul) or suburban locations. According to MN Housing, these costs reflect everything that goes into total development costs, including acquisition costs, construction costs, and soft costs. These estimates are adjusted downward by 2.4% to account for inflation between 2026 and 2027, thus converting the 2027 predicted costs back to 2026 dollars to be compared against current rents. The calculator automatically selects the urban or suburban cost figure based on the municipality selected in the summary sheet.
3. Override with custom value: A user-entered per-unit cost for ad hoc scenarios.

The pro forma cost build-up includes:

Cost Component	Assumption
Land acquisition	$31,400 per unit
Site preparation	$10 per site SF
Parking	$20,000 per space (1.5 spaces/unit)
Hard cost	$250 per leasable SF
Permit & fees	$7,915 per unit
Soft costs	20% of hard costs
Construction loan interest	(Loan-to-cost 65%) x (SOFR + 4%) x 65% drawdown x 18 months
Loan fees	0.75% of loan amount

Feasibility Test: Yield on Cost

The primary feasibility metric is **Yield on Cost (YOC)**, defined as:

YOC = NOI / Total Development Cost

The minimum acceptable YOC is set at 6.25%, reflecting investor return requirements in the current interest rate environment. Projects with a YOC below 6.25% are unlikely to proceed. If a project's YOC exceeds 6.25%, the surplus represents capacity to absorb additional costs (including housing fees) while remaining feasible.

Calculating the Economically Feasible Fee

The economically feasible fee is derived as follows:

1. Calculate the project's YOC under each development cost scenario.
2. Subtract the minimum required YOC (6.25%) to determine the "absorbable impact to YOC."
3. Multiply the absorbable YOC by total development cost to determine the total dollar amount available for fees.
4. Capitalize that amount at the market capitalization (cap) rate to convert the income stream impact into a capital value. The cap rate is defined as NOI divided by current market value; dividing by the cap rate converts an NOI impact into the equivalent property value impact. The cap rate used here (5.7%) is from CoStar for Minneapolis-region market-rate multifamily properties built since 2020.
5. Divide by the number of units to yield the feasible fee per unit.

> **Feasible fee per unit = ((YOC - YOC minimum) x Total Development Cost) / Cap Rate / Number of Units**

If the YOC is below the minimum threshold (meaning the project is already infeasible before any fee), the economically feasible fee is zero.

Permanent Financing Assumptions

The model also includes permanent financing parameters used in the underlying feasibility assessment:

Parameter	Value	Source
Debt service coverage ratio	1.25x	Industry standard
Annual interest rate	6.09%	Freddie Mac Primary Mortgage Market Survey, Feb 2026
Loan term	10 years	Industry standard
Amortization	30 years	Industry standard

Reconciling the Two Analyses

The final recommended fee per market-rate unit is:

> **Recommended fee = MIN(Maximum nexus fee, Maximum economically feasible fee)**

If the economically feasible fee is less than the nexus fee, the fee should be set at the feasible level to avoid discouraging development. If the nexus fee is less than the feasible fee, the fee cannot exceed the nexus amount, which represents the legally defensible maximum based on the demonstrated causal relationship between development and affordable housing need.

If neither calculation produces a positive result (i.e., the project is infeasible and there is no demonstrable nexus), the recommended fee is zero.

Implied Market-Rate-to-Affordable Unit Ratio

The recommended fee can also be expressed as an implied ratio of market-rate units to affordable units. For each AMI category, dividing the subsidy required per affordable unit by the maximum justifiable fee per market-rate unit yields the number of market-rate units needed to support one affordable unit at that income level. For example, if the subsidy required for a 60% AMI unit is $100,000 and the maximum justifiable fee is $25,000 per market-rate unit, 4 market-rate units would be needed to support one 60% AMI unit. This ratio provides a practical translation of the fee-in-lieu amount into an equivalent on-site inclusionary percentage, which municipalities can use when structuring the unit-provision in their IHOs.

Data Sources

Source	Description	Used For
CoStar (Jan 2026)	Market-rate multifamily rents and cap rates, new construction	Rental revenue, cap rate for fee capitalization
MN Housing Finance Agency	Predicted development costs per unit (2027 $)	Alternative cost scenario (urban/suburban)
Freddie Mac PMMS (Feb 2026)	30-year mortgage rate	Permanent financing interest rate
FRED (Federal Reserve)	Effective federal funds rate, SOFR	Construction financing interest rate
Met Council Future Need for Affordable Housing allocations	Community designations and affordable housing allocations	Urban/suburban classification, policy benchmarks

05 | RECOMMENDED POLICY OPTIONS

The Economics of Inclusionary Housing Ordinances

As described earlier, in an IHO, the below-market units are funded through an internal subsidy from the market-rate units. For this reason, it is important that the details of an IHO be carefully developed to ensure that the policy's requirements don't make new housing development infeasible. At the same time, requirements must be consistent with the housing needs of the community. Since IHO policies rely on market-rate development to be successful, communities without a lot of development activity won't benefit as much from an IHO policy. However, in strong markets, they can work well to produce workforce housing units. Adding development incentives to an IHO can also help offset the cost of compliance. (Urban Land Institute, 2016).

There is often a misperception that requiring a high IHO requirement will always produce more below-market affordable housing. In reality, an IHO could potentially reduce the number of below-market affordable units by making it infeasible to build any housing. As an internal subsidy, an IHO requires that a development produce enough cash flow over time to absorb this cost, just like any other cost that a development might have to incur to move forward. Research also suggests adding development incentives to an IHO to help offset the cost of compliance. The Economic Feasibility Analysis described in Section 4 and provided as part of this study gives communities a tool to analyze this issue.

There is evidence that land prices may adjust if an IHO is kept in place for a sustained period of time. However, the most effective IHO policies need to be able to adapt in response to changing market conditions. At the same time, an IHO should be somewhat consistent so developers know what the rules are. Balancing consistency with flexibility is the challenge to making a good IHO.

Inclusionary Housing Ordinance Options

An IHO generally assumes that developers will provide the affordable units within their development. That approach provides for a mix of incomes as development occurs, contributing to creating an inclusive sense of place. Planners sometimes prefer this option, as the affordable units are provided at the same time as the market rate units. However, alternative options for compliance exist in many ordinances:

- **Providing a Fee-in-Lieu Option:** A fee-in-lieu is a cash payment to a local government based on the number of affordable units the development would be required to provide. This option requires that the municipality have some kind of affordable housing trust fund in place to receive the funds, and also that the municipality has processes in place to make sure these funds turn into below-market affordable units. While there are the place-making advantages of providing units within a new development, there are also benefits to allowing for a fee-in-lieu. Developers often prefer paying a fee-in-lieu as a reasonable fee-in-lieu is often easier to provide than on-site units. Communities that have recently adopted an IHO may be more interested in getting fee-in-lieu payments to build up their affordable housing trust fund. Those funds can be used flexibly, and often can be leveraged with other sources such as Low Income Housing Tax Credits to create more affordable units than the developer might provide on-site. Nexus Calculator outputs the maximum economically feasible fee-in-lieu value as a function of the market rate assumptions.

- **Providing Off-Site Units:** Another way developers sometimes are able to meet IHO requirements is through off-site units. For example, a developer may buy a small apartment building near their proposed development, renovate it, and manage it as below-market affordable rental units. If this option is included in an ordinance, care must be taken to make sure the units are comparable to ones that would be provided on-site and that the off-site units get funding in their reserves for future capital needs and routine maintenance.

Policy Options

There are a variety of policy options in an IHO beyond whether to permit a fee-in-lieu option or off-site units. Some of these options include:

- Whether the program is mandatory or voluntary with incentives
- The set-aside requirements
- What income levels or target recipients of inclusionary units are chosen
- What incentives exist to support developers for which the policies apply
- Whether the IHO applies to the entire municipality or only certain locations
- Whether off-site development is permitted, and, if so, where
- The terms and conditions of affordability over time
- Consistency with legal requirements (Jacobus, 2019).

What Works

Within that overall framework, an IHO works best when it meets the following conditions:

- It is based on a study that examines the housing market needs and potential to support inclusionary housing policies. This report and the data it provides serves this role for communities in the Twin Cities region.
- It has a set of options that are tailored to the specific housing market in the community, both for market-rate and affordable housing.
- It provides clear options for developers, and the municipality creates the administrative structures to support the options.
- It is periodically examined based on changing market conditions and updated as needed.
- It is not seen as the only solution to below-market affordable housing production needs.

Recommendations

Based on the analysis in this study as well as a review of national best practices, Inclusionary Housing Ordinances in municipalities in the Metropolitan Council region should:

➔ **Be sensitive to market conditions**. This analysis suggests that only certain municipalities may currently have markets strong enough to support Inclusionary Housing Ordinances. Municipal planners and leaders should think carefully about whether an IHO will improve progress towards affordability targets or limit housing development without affordability benefits. As shown in this study's feasibility analysis, a new suburban multifamily project must achieve rents of at least $2,664/month ($3.33/SF) just to reach the 6.25% yield on cost that investors require before any IHO is applied. Adding a modest IHO (10% of units at 50% AMI) raises that threshold to $2,861/month ($3.98/SF). Communities where new-construction rents fall below these levels lack the headroom in the current market to support an IHO without discouraging development. Communities could consider applying IHO only to specific neighborhoods where by-right

multifamily development can support top-of-the-market rents and produce investor returns adequate to produce new housing.

➔ **Tailor IHO requirements to specific markets**. One of the strengths of the IHO tool is its adaptability to local conditions. Once there is a decision to use IHO as one of the ways to meet affordability goals, the specifics of the ordinance can be fine tuned based on (a) local market conditions and (b) local affordability needs. Aspects of an IHO that can be adjusted as needed include:

- *Minimum development sizes at which IHO would apply*. While IHOs often set this minimum at ten units, it could be higher or lower in a stronger or less strong market. For example, a community where rents are high will produce more revenue per unit for a developer than one where rents are lower. A stronger market can therefore absorb a higher IHO requirement than a less strong one.
- *Percentage of units in a development that must be affordable.* This requirement is often ten percent, but could also be higher or lower based on local conditions. It will be important to keep in mind that the percentage required and the number of units may interact to result in fractional units, that should be accounted for in the policy as either eligible for a fractional fee-in-lieu and/or rounding up or down to whole numbers of units.
- *What level of affordability is required in those units.* As stated in the Housing Needs Assessment in Section 2, Met Council allocates affordable housing at different income levels based on a number of factors, such as 30% or 60% of Area Median Income (AMI). The percentage of units required to be below-market affordable at which household income level is established in the IHO and should reflect the needs identified by the Met Council. Lower income thresholds require larger cross-subsidies, so deeper affordability is typically associated with a lower percentage of affordable units required.
- *Whether there are fee-in-lieu or off-site options available*. Municipalities have options on how to meet affordable housing needs based on local conditions and priorities:
  - As described earlier, some municipalities are willing to accept fee-in-lieu payments as they prioritize building their local affordable housing funds. Developers often like this option as well, as it's easier to provide an up-front expense than manage an ongoing requirement like on-site units. However, once a fee-in-lieu is accepted, the municipality should have a system in place to administer a local affordable housing trust fund and to utilize the funds.
  - Communities with high balances in their trust funds may prefer to limit fee-in-lieu options to produce on-site units. However, most municipalities still accept fee-in-lieu payments for fractional units.
  - Similarly, some municipalities are willing to consider off-site units, such as ones that have existing housing stock in need of rehabilitation. Others may prefer not to provide that option, because the administrative costs of managing off-site units are too high, or there are not a lot of off-site options comparable to the units being developed.
- *At what level the fee-in-lieu amount is set*. The simplest way to determine a fee-in-lieu is by calculating the amount of internal subsidy the developer is putting into below-market affordable units. This study provides a tool for communities to determine the maximum fee-in-lieu, or nexus fee. Some communities may choose to use a lower amount based on local preference or conditions.

- ➔ ***Consider density bonuses and other zoning relief as an incentive.*** One way to make any IHO requirement more financially feasible is to tie the requirement to eligible incentives for development subject to an IHO. For example, Portland, Maine's 2015 IHO stipulated that a developer subject to the ordinance was eligible to build 25% more units. The density bonus shifted the economics of a development - a developer could build nine units with no IHO requirement, or 12 with one IHO unit. The additional two market rate units offset the one IHO unit. Other ways to provide incentives could include eligibility for additional height, expedited review, or reduced parking requirements. All of these changes in municipal development requirements can increase net project revenue, some of which can then be used to fund the IHO requirements.
- ➔ ***Consider applying an IHO neighborhood-by-neighborhood in municipalities with varying internal markets.*** Housing markets can vary significantly across neighborhoods. If so, it may be worth foregoing the benefits of IHO in neighborhoods with less robust markets in order to simply get the additional housing production. On the other hand, strong markets often have both a higher need for affordable housing, as well as the economics to support a stronger IHO. Communities with varied neighborhoods can create an overlay map or use existing zoning districts to indicate where IHO applies, and potentially vary the IHO requirements by neighborhood.
- ➔ **Use IHO as one tool among many**. If applied properly, IHO can help address affordability needs in communities in the Twin Cities. However, IHO by itself will not entirely address these needs. Communities should look to a range of tools, including direct subsidy of affordable developments, encouragement of developments using federal resources such as the Low Income Housing Tax Credit, regulatory changes, reduction of parking requirements, and provision of public land for below-market affordable housing, to name a few.

APPENDIX A: ENGAGEMENT SUMMARY

Regional Housing Nexus Study — Focus Group Summary

Municipal staff and developer sessions, January 13–15, 2026

How municipalities would use the tool

- Establish legal defensibility for IHO fees and requirements post-Sheetz
- Replace ad hoc fee-setting with a data-backed, standardized methodology
- Generate hyper-local nexus findings using community-specific inputs (land costs, rents, wages, commute patterns)
- Run simplified proforma feasibility analysis
- Calculate and calibrate in-lieu fees based on the delta between market and affordable rents
- Benchmark policies and market conditions across peer communities via live spreadsheets
- Support periodic policy review cycles without repeated consultant engagements
- Translate development economics into accessible visuals for elected officials and the public
- Inform model ordinance and compliance framework design
- Extend analysis beyond multifamily rental to all land use types

Market realities shaping IHO feasibility

- Construction costs at $300–350K/unit; some projects selling below replacement cost
- Lender equity requirements have roughly doubled, shifting risk onto developers
- Hold periods extended from 5–7 years to 10–15 years; patient capital required
- Post-pandemic collections still 10–15% below normal; NOAH appraisals down 25–30%
- 60% AMI approximates market rent in much of the region, limiting IHO's additionality at that threshold
- Deep affordability (below 50% AMI) requires dedicated operating subsidy and services that cannot be achieved through IHO alone
- Multiple stacking policy requirements (sustainability, prevailing wage, design standards) compound feasibility pressure
- 4D tax classification creating unintended market distortions and tax-base shifts
- Rent control discussion alone deters investment; IHO is sometimes conflated with rent control by capital markets
- Shift from PUD-based negotiation to by-right zoning removes the traditional leverage for requiring affordability
- Fundamental trust deficit between cities and developers around pro forma assumptions and feasibility standards
- Operational challenges for mixed-income, rent restricted properties leading to increased management costs

Opportunities and alternative approaches

- Revenue-sharing tied to project profitability rather than unit set-asides
- Flat per-SF impact fee across all land uses, set predictably like a park dedication fee
- Menu of compliance options (density bonus, parking reduction, fee waiver, on-site units)
- Regulatory relief (zoning flexibility, parking reductions) traded for affordability commitments

- Dedicated local trust funds for direct subsidy at deeper affordability levels
- Rehabilitation and preservation programs with deed restrictions where new development is scarce
- Developers expressed the opinion that higher AMI targets are operationally simpler to manage
- Housing-as-infrastructure framing to depoliticize affordability contributions
- State-level extension of the 20-year affordability declaration limit
- Shared, regularly updated analytical framework that reduces subjectivity in city-developer negotiations
- Public-private partnering on property management training for regulatory compliance

Inclusionary Zoning and the Housing Nexus Policy Meeting

Policy makers, city leadership, and community stakeholders, March 17, 2026

Implementation and communication discussion

- Participants requested a five-panel flow diagram to replace the dense table format and make the nexus calculation accessible to Met Council members and the public.
- Suggestions to label each row of the calculation table, define terms, and build the table up row by row during presentations to unpack the methodology step by step.
- Recognition that the math varies by neighborhood and even by individual project, reinforcing the need for a tool that can be recalibrated to local conditions. Discussion about how communities should consider varying IHO by neighborhood, including waiving requirements in lower-rent areas where organic multifamily development is desired.
- Developers value transparency and appreciate when cities demonstrate calculations rather than imposing variable fees. Developers prefer a known, fixed fee (per SF or per unit) that they can factor into proformas upfront, rather than a variable calculation for each project.
- The nexus study is essential for legally justifying the payment-in-lieu fee under the rational nexus standard.

Market Data Considerations

- CoStar rent data likely includes projects that received subsidies such as TIF, pulling average rents below true levels needed to make new construction possible without subsidy
- Participants were advised to consult local developers and use the override function to input expected market-rate rents for their communities

The Housing Nexus Tool – Technical Deep Dive Meeting

Planners, Community, and Economic Development teams, March 17, 2026

Tool Methodology and Demonstration

- The tool performs two core calculations: the nexus test (establishing the rational connection between market-rate development and affordable housing demand under the Sheetz/Nollan/Koontz decisions) and the economic feasibility analysis (determining what the market can absorb using a 6.25% yield-on-cost threshold)
- The nexus calculation traces a causal chain from market-rate household income through consumer spending, local wages, worker households, and AMI-sorted housing demand to arrive at a per-unit and per-SF maximum fee
- The economic feasibility analysis default uses a 200-unit multifamily scenario, calculating whether the development can achieve the required yield on cost after applying IHO set-asides at various AMI targets
- The recommended fee for any community is the lesser of the nexus ceiling and the feasibility ceiling, ensuring both legal defensibility and market viability

CoStar data and market rate rent challenges

- MN Housing construction costs without subsidies requires closer to $3/SF asking rent to be feasible; supporting IHO without subsidies requires approximately $4/SF
- Communities should view CoStar rents with skepticism and prioritize conversations with local developers to determine expected rents for new construction
- The tool defaults to the one-bedroom unit with the highest average rent (85th percentile asking rate) as a proxy for new development, with full override capability

Tool usability

- Color-code editable cells and lock formula cells (but do not hide formulas) to make it clearer what users can change
- Create a tutorial video or webinar demonstrating how to input numbers and adjust variables
- Add notes explaining the CoStar 85th-percentile rent methodology and the purpose of the override function
- Include annotations or labels for key cells to help users identify important outputs
- Enable testing of combinations of required percentages at different AMI levels on the feasibility tab

Communication materials

- Attendees requested simplified, narrative-driven materials (infographic, slide deck) to defend the policy to city councils, neighborhood groups, and public hearings
- Recommended structure: the premise, the math (as a flow chart), and a statement that a temporary change in the market does not change the underlying need for housing
- The occupations/wages diagram was popular and participants asked whether it could be produced as a standalone visual

Policy and legal considerations

- State law allows affordable housing policies based on units, but the nexus study is essential for legally justifying the payment-in-lieu fee by establishing the required nexus between the fee and the demonstrated impact of a specific development project
- The nexus methodology is the standard, legally defensible approach for nexus studies

Tool scope, rollout, and maintenance

- The current scope is limited to rental development types; ownership was excluded due to the complexity of additional assumptions
- The Met Council will serve as the maintainer, providing technical assistance to communities and updating the tool as a cost-saving alternative to individual community nexus studies
- CoStar data is updated by Met Council quarterly; the full tool update is expected to be annual based on other data sources (CES, economic census, QCEW)

APPENDIX B: CES-TO-NAICS ALLOCATION METHODOLOGY

The nexus calculator traces household spending through Consumer Expenditure Survey (CES) categories to specific NAICS industries where that spending generates local employment. This requires allocating each CES expenditure category across the retail and service businesses where consumers actually transact. These allocation percentages determine how much of each dollar of household spending flows to each industry, which in turn drives the receipts-to-wages conversion and the worker count that underpins the nexus fee calculation. The allocations documented here use data-driven percentages sourced from federal economic surveys. Each allocation is traceable to a specific data source and vintage.

Approach

Two Allocation Strategies

CES categories fall into two groups that require different sourcing approaches:

Goods categories (food, apparel, furnishings, drugs, supplies, vehicles, fuel, tobacco, reading materials). Consumers purchase these at retail stores. For goods categories, allocations are derived from:

- Census Annual Retail Trade Survey (ARTS) 2022, which reports retail sales by NAICS subsector. The relative sales volumes across retail channels indicate where consumer dollars arrive.
- USDA Economic Research Service Food Expenditure Series 2023, which reports food spending by outlet type (grocery stores, warehouse clubs, restaurants, convenience stores).

Service categories (healthcare, transportation, entertainment, education, personal services, professional services, household operations). Consumers purchase these directly from the service provider. The BEA Use Table's Personal Consumption Expenditure (PCE) column maps to the point-of-sale NAICS codes. For service categories, allocations are derived from:

- BEA Use Table 2017 benchmark detail, PCE column. The relative PCE values across service NAICS codes within each CES category determine the allocation shares.

NAICS Code Translation

The crosswalk maintains two code systems:

- (CES-to-NAICS) uses BEA I-O commodity codes and 2017 NAICS, matching the BEA source data.
- (CES-to-NAICS-QCEW) translates those codes to the 2022 NAICS codes used in the MN DEED QCEW and 2022 Economic Census. Where multiple source codes map to the same 2022 NAICS code, allocations are summed into a single row.

Normalization

After initial allocation, each category's shares are normalized to sum to exactly 100.0%. Two categories required normalization: Food at home (raw sum 96.1%, due to USDA outlet shares not exhausting the "other" category) and Medical services (raw sum 97.1%, due to filtering out BEA PCE shares below 2%).

Data Sources

Source	Vintage	Description	Used For
Census ARTS	2022 (restated 2017 NAICS)	Annual Retail Trade Survey, retail sales by NAICS subsector	Goods category allocations across retail channels
USDA ERS Food Expenditure Series	2023 annual	Food spending by outlet type and purchaser	Food at home and food away from home allocations
BEA Use Table	2017 benchmark detail	Input-output use table, PCE column (column 406)	Service category allocations by PCE value
BEA PCE Bridge Table	2007 benchmark detail	Maps PCE categories to I-O commodities with dollar values	Reference; producers-level mapping
BLS CE/PCE Concordance	2022	Maps CE UCC codes to BEA PCE line items	CE-to-PCE category crosswalk
BEA I-O to NAICS Concordance	2017 NAICS	Maps BEA I-O commodity codes to NAICS	Code translation layer
MN DEED QCEW	7-county Twin Cities planning area	Average annual wages by NAICS industry	Wage lookup for QCEW-compatible codes
U.S. Census Economic Census (EC22)	2022	Gross receipts and annual payroll by NAICS	Receipts-to-wages ratio lookup

Category-by-Category Allocations

Each category below shows the QCEW-compatible NAICS code (Sheet 6), allocation percentage, QCEW average annual wage, and the sourcing rationale. Where codes were consolidated from multiple source codes, the original codes are noted.

Food at home

Type: Goods. Source: USDA ERS Food Expenditure Series (2023 annual), supplemented by Census ARTS (2022).

The USDA ERS reports food-at-home spending by outlet type for 2023: grocery stores received 57% of total food-at-home (FAH) expenditures, warehouse clubs and supercenters received 26%, and the remaining 17% went to other outlets (convenience stores, specialty food stores, online grocery). The "other" share is split across specialty food stores, convenience retailers, and the e-commerce/general merchandise proxy, with shares rounded and normalized.

NAICS	Industry	Allocation	Wage	Notes
4451	Grocery Stores	59.4%	$34,736	USDA ERS: grocery stores = 57% of FAH, normalized
4552	Warehouse Clubs, Supercenters, Other General Merch	32.3%	$38,428	Combined: 4523 (warehouse clubs, 26% USDA) + 4541 (online grocery, 5%)
4452	Specialty Food Stores	4.2%	$27,872	Census ARTS: $25.3B specialty food / ~$949B total food retail
44513	Convenience Retailers	4.2%	$32,188	Remainder of USDA "other FAH" allocated to convenience stores

Food away from home

Type: Service. Source: USDA ERS Food Expenditure Series (2023 annual).

The USDA ERS reports food-away-from-home (FAFH) spending by outlet type for 2023: full-service restaurants received 40%, limited-service restaurants received 40%, and other outlets (caterers, mobile food, bars, cafeterias) received 20%. Under 2022 NAICS, full-service and limited-service restaurants are combined into a single code (72251).

NAICS	Industry	Allocation	Wage	Notes
72251	Restaurants	80.0%	$27,768	Combined: 722511 (full-service, 40%) + 722513 (limited-service, 40%)
7223	Special Food Services	10.0%	$38,948	Half of "other FAFH": caterers, mobile food services
7224	Drinking Places (Alcoholic Beverages)	3.0%	$27,820	15% of "other FAFH": bars/taverns
72241	Drinking Places (Alcoholic Beverages)	7.0%	$27,820	35% of "other FAFH": cafeterias, buffets, workplace food service

Alcoholic beverages

Type: Goods. Source: Census ARTS (2022) for retail channels; BEA Use Table (2017) for on-premises; BLS CES for off/on-premises split.

BLS CES data indicates approximately 55% of household alcohol spending is off-premises (retail stores) and 45% is on-premises (bars and restaurants). The off-premises share is split between dedicated liquor stores and grocery stores. On-premises is allocated to bars and restaurants.

NAICS	Industry	Allocation	Wage	Notes
4453	Beer, Wine, and Liquor Stores	40.0%	$29,588	Census ARTS: $69B in dedicated liquor stores
4451	Grocery Stores	20.0%	$34,736	Grocery store alcohol sales (varies by state; MN allows 3.2% beer)
7224	Drinking Places	15.0%	$27,820	BEA Use Table: bars/taverns on-premises alcohol
72251	Restaurants	25.0%	$27,768	Combined: full-service (15%) + limited-service (10%) alcohol with meals

Maintenance, repairs, insurance, other expenses

Type: Service. Source: Census ARTS (2022) for retail hardware; BEA Use Table (2017) for service NAICS.

This category covers home repair materials (purchased at hardware/building material stores), repair services (appliance repair, locksmiths), property services (landscaping, pest control, cleaning), property management fees, and renters/homeowners insurance.

NAICS	Industry	Allocation	Wage	Notes
4441	Building Material and Supplies Dealers	35.0%	$45,968	Census ARTS: $443B; largest retail channel for home repair materials
8114	Personal and Household Goods Repair	25.0%	$43,108	BEA Use Table PCE: appliance repair, locksmiths
5617	Services to Buildings and Dwellings	20.0%	$44,564	BEA Use Table PCE: landscaping, pest control, cleaning
5311	Lessors of Real Estate	10.0%	$64,584	Property management fees, condo/HOA management
5241	Insurance Carriers	10.0%	$161,356	Renters and homeowners insurance premiums

Fuel oil and other fuels

Type: Goods. Source: Census ARTS (2022).

Census ARTS reports $46.8B in fuel dealer sales (2022). Virtually all household purchases of heating oil, propane, and firewood are from fuel dealers via direct delivery.

NAICS	Industry	Allocation	Wage	Notes
45721	Fuel Dealers	100.0%	$71,916	Census ARTS: fuel dealers (heating oil, propane, firewood)

Water and other public services

Type: Service. Source: BEA Use Table (2017) PCE column for utility/service sectors.

Allocated based on relative BEA PCE values across the four utility and waste management service sectors.

NAICS	Industry	Allocation	Wage	Notes
2213	Water, Sewage and Other Systems	35.0%	$83,356	BEA Use Table PCE
562	Waste Management and Remediation Services	25.0%	$81,848	BEA Use Table PCE: trash/recycling collection
2211	Electric Power Generation and Distribution	25.0%	$148,668	BEA Use Table PCE: electricity
2212	Natural Gas Distribution	15.0%	$114,088	BEA Use Table PCE: natural gas

Household operations: Personal Services

Type: Service. Source: BEA Use Table (2017) PCE column for social service sectors.

Covers child care, elder care, home health aides, and related personal services purchased by households.

NAICS	Industry	Allocation	Wage	Notes
6244	Child Day Care Services	35.0%	$35,048	BEA Use Table PCE: largest personal service expense for households

NAICS	Industry	Allocation	Wage	Notes
6241	Individual and Family Services	30.0%	$36,296	BEA Use Table PCE: home health aides, elder care, social services
623	Nursing and Residential Care Facilities	20.0%	$45,552	BEA Use Table PCE
6242	Community Food, Housing, and Relief Services	15.0%	$57,824	BEA Use Table PCE

Household operations: Other Household Expenses

Type: Service. Source: BEA Use Table (2017) PCE column.

Covers janitorial services, landscaping, security systems, package delivery, and miscellaneous personal services consumed by households.

NAICS	Industry	Allocation	Wage	Notes
5617	Services to Buildings and Dwellings	40.0%	$44,564	BEA Use Table PCE: janitorial, landscaping, pest control
5616	Investigation and Security Services	15.0%	$40,508	BEA: security systems, alarm monitoring
5614	Business Support Services	15.0%	$72,956	Call centers, answering services (household-facing)
8129	Other Personal Services	15.0%	$32,864	BEA Use Table PCE: pet sitting, miscellaneous personal services
492	Couriers and Messengers	15.0%	$49,660	Household package delivery (UPS, FedEx consumer deliveries)

Housekeeping supplies

Type: Goods. Source: Census ARTS (2022) retail sales by channel.

Cleaning products, paper goods, and other housekeeping supplies are sold across multiple retail channels. Allocations reflect relative market share by retail type.

NAICS	Industry	Allocation	Wage	Notes
4451	Grocery Stores	35.0%	$34,736	Census ARTS: grocery stores sell cleaning/paper products alongside food
4552	Warehouse Clubs, Supercenters, Other General Merch	40.0%	$38,428	Combined: 4523 (30%) + 4541 (10%); Walmart, Target, Costco
4441	Building Material and Supplies Dealers	15.0%	$45,968	Census ARTS: Home Depot, Menards for cleaning/maintenance supplies
4599	Other Miscellaneous Retailers	10.0%	$50,024	Census ARTS: dollar stores, variety stores

Household furnishings and equipment

Type: Goods. Source: Census ARTS (2022) retail sales proportions for home goods channels.

Census ARTS 2022 reports: furniture stores $78.6B, home furnishings stores $61.9B, electronics/appliance stores $91B. Allocations reflect these relative sales volumes plus the growing general merchandise and online channels.

NAICS	Industry	Allocation	Wage	Notes
44911	Furniture Retailers	25.0%	$59,592	Census ARTS: furniture stores
44912	Home Furnishings Retailers	15.0%	$43,472	Census ARTS: home furnishings stores
4492	Electronics and Appliance Retailers	20.0%	$56,472	Census ARTS: electronics/appliance stores
4552	Warehouse Clubs, Supercenters, Other General Merch	35.0%	$38,428	Combined: 4523 (20%) + 4541 (15%); Walmart, Target, Costco, Amazon
4595	Used Merchandise Retailers	5.0%	$25,376	Census ARTS: thrift stores = $21.5B

Apparel and services

Type: Goods. Source: Census ARTS (2022) apparel retail channels; BEA Use Table (2017) for services.

Census ARTS 2022 reports: clothing stores $203B, shoe stores $40B, jewelry/luggage/leather $50B. The services component (dry cleaning, alterations) is from BEA PCE data.

NAICS	Industry	Allocation	Wage	Notes
4581	Clothing and Clothing Accessories Retailers	35.0%	$25,740	Census ARTS: clothing stores
4582	Shoe Retailers	8.0%	$30,316	Census ARTS: shoe stores
4583	Jewelry, Luggage, and Leather Goods Retailers	5.0%	$56,836	Census ARTS: jewelry/luggage/leather
4552	Warehouse Clubs, Supercenters, Other General Merch	40.0%	$38,428	Combined: 4523 (20%) + 4541 (20%); Walmart, Target, Amazon
8123	Drycleaning and Laundry Services	5.0%	$50,180	BEA Use Table PCE: clothing services
8114	Personal and Household Goods Repair	2.0%	$43,108	BEA Use Table: shoe repair, alterations
4595	Used Merchandise Retailers	5.0%	$25,376	Census ARTS: thrift stores, consignment

Vehicle purchases (net outlay)

Type: Goods. Source: Census ARTS (2022) motor vehicle dealer sales by subsector.

Allocations are computed directly from Census ARTS dealer sales: new car dealers $1,126,893M, used car dealers $146,847M, other motor vehicle dealers (motorcycle, boat, RV) $101,803M.

NAICS	Industry	Allocation	Wage	Notes
44111	New Car Dealers	81.9%	$77,376	Census ARTS: $1,126,893M / $1,375,543M total

NAICS	Industry	Allocation	Wage	Notes
44112	Used Car Dealers	10.7%	$66,924	Census ARTS: $146,847M
4412	Other Motor Vehicle Dealers	7.4%	$65,624	Census ARTS: motorcycle, boat, RV dealers $101,803M

Gasoline and motor oil

Type: Goods. Source: Census ARTS (2022).

Census ARTS reports $734B in gasoline station sales (2022). Virtually all consumer gasoline is purchased at gasoline stations.

NAICS	Industry	Allocation	Wage	Notes
4571	Gasoline Stations	100.0%	$32,968	Census ARTS: gasoline stations

Vehicle maintenance and repairs

Type: Service. Source: BEA Use Table (2017) for service NAICS; Census ARTS (2022) for retail parts.

NAICS	Industry	Allocation	Wage	Notes
8111	Automotive Repair and Maintenance	70.0%	$64,792	BEA Use Table PCE: oil changes, brake repair, body work, car washes
4413	Automotive Parts, Accessories, and Tire Stores	20.0%	$46,852	Census ARTS: consumer purchases of parts, tires, accessories
5321	Automotive Equipment Rental and Leasing	10.0%	$70,564	BEA Use Table PCE: rental car component

Local transportation services

Type: Service. Source: BEA Use Table (2017) PCE column for transportation service sectors.

NAICS	Industry	Allocation	Wage	Notes
485	Transit and Ground Passenger Transportation	58.0%	$50,336	BEA Use Table PCE: buses, taxis, rideshare, paratransit
481	Air Transportation	31.0%	$117,676	BEA Use Table PCE: includes some intercity air in CES "local" category
488	Support Activities for Transportation	12.0%	$88,088	Parking garages, tolls, towing services

Medical services

Type: Service. Source: BEA Use Table (2017) PCE column for healthcare sectors (NAICS 621-623).

Allocations are computed directly from BEA PCE values for healthcare service sectors, filtered to those with at least 2% share, then normalized to 100%. Hospitals represent the largest share at 45.9%, consistent with the dominant role of hospital spending in healthcare PCE.

NAICS	Industry	Allocation	Wage	Notes
622	Hospitals	45.9%	$91,624	BEA: largest healthcare PCE component
6211	Offices of Physicians	21.7%	$121,368	BEA Use Table PCE
623	Nursing and Residential Care Facilities	8.3%	$45,552	BEA Use Table PCE
6214	Outpatient Care Centers	7.1%	$103,324	BEA Use Table PCE
6212	Offices of Dentists	5.7%	$81,172	BEA Use Table PCE
6216	Home Health Care Services	4.7%	$40,508	BEA Use Table PCE
6213	Offices of Other Health Practitioners	4.2%	$56,420	BEA Use Table PCE
6232	Residential Mental Health/Substance Abuse	2.4%	$47,944	BEA Use Table PCE

Drugs

Type: Goods. Source: Census ARTS (2022) health and personal care store sales.

Census ARTS reports pharmacies and drug stores at $335,881M of $397,019M total health/personal care retail (2022). The remainder goes through general merchandise channels (Walmart, Costco pharmacy departments) and mail-order/online pharmacy.

NAICS	Industry	Allocation	Wage	Notes
45611	Pharmacies and Drug Retailers	85.0%	$66,092	Census ARTS: pharmacies dominate prescription drug retail
4552	Warehouse Clubs, Supercenters, Other General Merch	15.0%	$38,428	Combined: 4523 (10%) + 4541 (5%); Walmart, Costco pharmacy, Amazon Pharmacy

Medical supplies

Type: Goods. Source: Census ARTS (2022) health/personal care and optical retail.

NAICS	Industry	Allocation	Wage	Notes
45611	Pharmacies and Drug Retailers	40.0%	$66,092	OTC medical supplies, bandages, first aid, thermometers
45613	Optical Goods Retailers	25.0%	$57,044	Census ARTS: optical goods stores $12,103M; eyeglasses, contacts
4552	Warehouse Clubs, Supercenters, Other General Merch	35.0%	$38,428	Combined: 4523 (20%) + 4541 (15%); Walmart, Target health aisles, Amazon

Entertainment fees and admissions

Type: Service. Source: BEA Use Table (2017) PCE column for arts, entertainment, and recreation sectors (NAICS 71).

Allocations are computed from BEA PCE values for entertainment service sectors, filtered to those with at least 2% share, then normalized. Gambling Industries (713200) was removed from this category because casino gambling in Minnesota is primarily tribal and located outside the core metro employment base, making the national BEA PCE weight (which would have been 34.7%) inappropriate for a Twin Cities nexus model.

NAICS	Industry	Allocation	Wage	Notes
7139	Other Amusement and Recreation Industries	38.3%	$25,636	BEA Use Table PCE: bowling, golf, recreation
7111	Performing Arts Companies	15.5%	$39,312	BEA Use Table PCE
5121	Motion Picture and Video Industries	12.3%	$31,668	BEA Use Table PCE: movie theaters
7112	Spectator Sports	10.1%	$268,268	BEA Use Table PCE
7121	Museums, Historical Sites, Zoos, Parks	10.1%	$52,312	BEA Use Table PCE
7131	Amusement Parks and Arcades	8.3%	$36,140	BEA Use Table PCE
7113	Promoters of Performing Arts/Sports	5.4%	$26,416	BEA Use Table PCE

Audio and visual equipment and services

Type: Goods/Service mix. Source: Census ARTS (2022) for electronics retail; BEA Use Table (2017) for media services.

This category spans both physical electronics purchases (TVs, audio equipment) and media service subscriptions (cable, streaming, internet).

NAICS	Industry	Allocation	Wage	Notes
4492	Electronics and Appliance Retailers	30.0%	$56,472	Census ARTS: electronics stores
51711	Wired Telecommunications Carriers	20.0%	$109,876	BEA Use Table PCE: cable TV, internet bundles
4552	Warehouse Clubs, Supercenters, Other General Merch	35.0%	$38,428	Combined: 4523 (15%) + 4541 (20%); Walmart, Costco, Amazon electronics
5182	Data Processing, Hosting, and Related Services	10.0%	$172,536	BEA Use Table PCE: streaming services (Netflix, etc.)
5121	Motion Picture and Video Industries	5.0%	$31,668	BEA Use Table PCE: movie theaters, video rental

Pets, toys, hobbies, and playground equipment

Type: Goods. Source: Census ARTS (2022) for retail; BEA Use Table (2017) for vet/pet services.

NAICS	Industry	Allocation	Wage	Notes
45991	Pet and Pet Supplies Retailers	25.0%	$38,584	Census ARTS: pet stores

NAICS	Industry	Allocation	Wage	Notes
54194	Veterinary Services	15.0%	$58,916	BEA Use Table PCE: vet visits are a major pet expense
45912	Hobby, Toy, and Game Retailers	15.0%	$25,480	Census ARTS: hobby/toy/game stores
4552	Warehouse Clubs, Supercenters, Other General Merch	35.0%	$38,428	Combined: 4523 (20%) + 4541 (15%); Walmart, Target, Chewy.com
81291	Pet Care (except Veterinary) Services	10.0%	$29,276	Pet grooming, boarding, walking services

Other entertainment supplies, equipment, and services

Type: Goods. Source: Census ARTS (2022) for retail; BEA Use Table (2017) for recreation services.

NAICS	Industry	Allocation	Wage	Notes
45911	Sporting Goods Retailers	30.0%	$34,944	Census ARTS: sporting goods stores
4552	Warehouse Clubs, Supercenters, Other General Merch	35.0%	$38,428	Combined: 4523 (20%) + 4541 (15%); Walmart, Target sporting goods
45912	Hobby, Toy, and Game Retailers	10.0%	$25,480	Census ARTS: hobby stores
71394	Fitness and Recreational Sports Centers	10.0%	$23,712	BEA: gym memberships, recreational sports
7132	Gambling Industries	10.0%	$33,956	BEA Use Table PCE: lottery, sports betting
4592	Book Retailers and News Dealers	5.0%	$27,196	Census ARTS: book/news stores

Personal care products and services

Type: Service. Source: BEA Use Table (2017) for services; Census ARTS (2022) for retail products.

This category spans personal care services (barbers, hair salons, nail salons, spas) and retail purchases of personal care products (cosmetics, toiletries).

NAICS	Industry	Allocation	Wage	Notes
8121	Personal Care Services	45.0%	$35,984	BEA Use Table PCE: barbers, hair salons, nail salons, spas
45611	Pharmacies and Drug Retailers	20.0%	$66,092	Census ARTS: cosmetics, toiletries sold at pharmacies
4552	Warehouse Clubs, Supercenters, Other General Merch	25.0%	$38,428	Combined: 4523 (15%) + 4541 (10%); Walmart, Target beauty aisles
4451	Grocery Stores	10.0%	$34,736	Personal care products sold alongside groceries

Reading

Type: Goods. Source: Census ARTS (2022) for book/stationery retail; BEA Use Table (2017) for publishers.

NAICS	Industry	Allocation	Wage	Notes
4592	Book Retailers and News Dealers	25.0%	$27,196	Census ARTS: book stores/news dealers
4552	Warehouse Clubs, Supercenters, Other General Merch	50.0%	$38,428	Combined: 4541 (35%) + 4523 (15%); Amazon dominates book retail
51313	Book Publishers	15.0%	$118,976	BEA Use Table PCE: direct publisher sales, digital content
4594	Office Supplies, Stationery, and Gift Retailers	10.0%	$35,620	Stationery, greeting cards, magazines

Education

Type: Service. Source: BEA Use Table (2017) PCE column for education sectors (NAICS 61, 6244).

Allocations are computed from BEA PCE values for education service sectors. Under QCEW consolidation, the three education codes (611A00 for colleges/universities, 611B00 for other educational services, and 611100 for K-12) all map to 6116 (Other Schools and Instruction) because public schools and public universities are not covered by the Economic Census. The EC22 ratio for 6116 (3.20) is a reasonable proxy across educational institutions, but the QCEW wages for the original codes ($64,428 for K-12, $81,380 for colleges) are significantly higher than the 6116 wage ($30,056). Users should consider substituting the more accurate QCEW wages for education workers when running the nexus model.

NAICS	Industry	Allocation	Wage	Notes
6116	Other Schools and Instruction	86.3%	$30,056	Combined: 611A00 (colleges, 57%) + 611B00 (other ed, 17%) + 611100 (K-12, 12%); wage understates actual; see note above
6244	Child Day Care Services	13.7%	$35,048	BEA Use Table PCE

Tobacco products and smoking supplies

Type: Goods. Source: Census ARTS (2022) retail channels for tobacco distribution.

Tobacco products are sold through multiple retail channels. Minnesota data confirms grocery stores and convenience stores as the primary distribution channels.

NAICS	Industry	Allocation	Wage	Notes
4451	Grocery Stores	35.0%	$34,736	Census ARTS: grocery stores as major tobacco channel
44513	Convenience Retailers	30.0%	$32,188	Primary tobacco retail channel
4552	Warehouse Clubs, Supercenters	15.0%	$38,428	Walmart, warehouse clubs
4571	Gasoline Stations	15.0%	$32,968	Gas station convenience stores
4599	Other Miscellaneous Retailers	5.0%	$50,024	Tobacco specialty shops, vape shops

Miscellaneous

Type: Service. Source: BEA Use Table (2017) PCE column for professional/personal service sectors.

Covers professional services consumed by households (legal, accounting, tax preparation) and miscellaneous personal services.

NAICS	Industry	Allocation	Wage	Notes
5411	Legal Services	30.0%	$141,388	BEA Use Table PCE: largest household professional service
5412	Accounting, Tax Preparation, Bookkeeping	25.0%	$110,344	BEA: tax prep, personal accounting
8122	Death Care Services	10.0%	$56,420	BEA: funeral homes, cremation, cemeteries
5419	Other Professional and Technical Services	15.0%	$74,256	BEA: miscellaneous professional services
8129	Other Personal Services	10.0%	$32,864	BEA Use Table PCE: photo finishing, misc personal services
5614	Business Support Services	10.0%	$72,956	BEA: document preparation, call centers serving households

Limitations

1. Census ARTS vintage: Retail market shares shift over time, and the 2022 snapshot may not fully reflect current conditions.

2. BEA Use Table vintage: The 2017 benchmark detail Use Table is the most recent available at the commodity detail level. Service sector spending patterns may have shifted since 2017, particularly in healthcare and digital services.

3. E-commerce: The crosswalk allocates a share of goods-oriented categories to Warehouse Clubs, Supercenters, and Other General Merchandise (NAICS 4552) as a proxy for e-commerce spending. This is an imperfect match because:
    - Receipts-to-wages ratios differ: Fulfillment centers and e-commerce operations have different labor intensity than retail storefronts.
    - Employment may not be local: When a household purchases from an online retailer, the fulfillment labor may occur in a distant warehouse rather than in the local trade area.
    - Wage levels differ: Warehouse and logistics workers at e-commerce fulfillment centers earn different wages than retail floor employees.

4. Education proxy: Public K-12 schools (NAICS 6111) and public colleges/universities (NAICS 6113) are not covered by the Economic Census because they are government entities. The crosswalk uses NAICS 6116 (Other Schools and Instruction) as a proxy for the EC22 receipts-to-wages ratio. The EC22 ratio for 6116 (3.20) is in line with the education sector average (2.5 to 3.5), but the QCEW wage for 6116 ($30,056) substantially understates K-12 wages ($64,428) and university wages ($81,380).

5. Mixed-channel categories: Several categories (apparel, housekeeping supplies, medical supplies) involve consumer spending that flows through multiple retail channels. The relative shares across channels are estimated from Census ARTS sales volumes but are not precisely calibrated to the specific product mix within each CES category.