

Remodeling Input Price Index (RIPI)

Methodology

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Introduction

NAHB Economics currently provides a monthly blog post¹ detailing residential building material prices from the Producer Price Index (PPI) published by the Bureau of Labor Statistics (BLS).

While this post is useful from a high-level perspective for the entire residential sector, it is not as helpful to the remodeling industry given the lack of specificity.

As a result, the NAHB Economics created the NAHB Remodeling Input Price Index (RIPI) which is a fixed-weight composite that measures monthly price changes among nonlabor inputs associated with residential improvements and routine residential maintenance and repair.

Methodology

PPI Measurements

Every month, BLS produces PPI measurements which track “*selling prices received by domestic producer for their output.*”² Within the PPI, there are two remodeling-related proxies; net inputs to other residential construction (WPUIP231130) and net inputs to residential maintenance and repair (WPUIP232100). Even though this category from the BLS is considered a catch-all category, the former is relatively close proxy for improvements since there are already established PPI measurements for single-family (WPUIP231110) and multifamily (WPUIP231120). Additionally, WPUIP231130 has more emphasis on residential improvements such as additions, alterations, and major replacements which are typically larger remodeling projects. As for the latter, this category, as the name implies, focuses on routine maintenance/work that repairs an existing home which are typically smaller remodeling projects.

When analyzing both PPI measurements back to the creation (i.e., indexed to 100 starting on December 2014), the Pearson correlation coefficient is extremely high ($\rho = 0.9977$) using 12-

¹ For an example of one of these blog posts, please click on the link for the July 2026 update:

<https://eyeonhousing.org/2026/08/building-material-prices-show-growth-in-july/>

² <https://www.bls.gov/ppi/>

month percentage changes. They differ by an average of 0.3 percentage points in absolute terms³, while the maximum difference is 1.5 percentage points⁴. These findings indicate that these PPI measurements generally provide similar signals, although meaningful divergences can occur in individual periods. This evidence suggests that both measurements contain useful information on the price pressures experienced by residential remodelers and should both be considered.

However, conceptually, each PPI measurement represents a different part of the remodeling industry, so, it is important to incorporate both into the analysis of changes for input prices for remodelers. As a result, a composite index was the final conclusion since this will provide a broader measurement of the remodeling industry.

Weights

Now that a composite index was determined, from a theoretical perspective, each PPI measurement does not represent the same share of the remodeling industry. Therefore, weights need to be calculated to determine the appropriate significance for each PPI measurement which changes to Equation 1:

$$RIPI_t = w^{PPI} * PPII_t + (1 - w^{PPI}) * PPIM_t, \quad (1)$$

where w^{PPI} is the weight applied to PPI measurement proxy for input prices to improvement, and the weight applied PPI measurement proxy for input prices to maintenance simply one minus w^{PPI} for time period t .

The initial estimated based on industry knowledge would be structured around the Pareto Principle⁵: roughly 80% for improvements and 20% for maintenance. Starting with improvements proxy (WPUIP231130), there is a line-item within the Gross Domestic Product (GDP) published by the Bureau of Economic Analysis (BEA) for improvement spending⁶. BEA's published annual current-dollar improvements values are used to calculate relative expenditure shares. Chained-dollar components are not additive and therefore should not be used to calculate component shares⁷.

³ The mean absolute difference was used to make this calculation, which is *Mean Absolute Difference (MAD)* = $\frac{1}{T} \sum_{t=1}^T |g_{A,t} - g_{B,t}|$, where t is the specific month, $g_{A,t}$ is one PPI measurement, and $g_{B,t}$ is the other. Same formula is used in the “Comparative Testing” section when comparing RIPI and Net Inputs to Residential Construction.

⁴ Formula used to calculate the absolute maximum difference is as follows: $\max_t |g_{A,t} - g_{B,t}|$, where t is the specific month, $g_{A,t}$ is one PPI measurement, and $g_{B,t}$ is the other. Same formula is used in the “Comparative Testing” section when comparing RIPI and Net Inputs to Residential Construction

⁵ https://en.wikipedia.org/wiki/Pareto_principle

⁶ Specifically, it is Line 46 from Table 5.4.5U. Private Fixed Investment in Structures by Type.

⁷ <https://bea.gov/resources/methodologies/chained-dollar-indexes>

For the maintenance proxy (WPUIP232100), there is a question within the biennial American Housing Survey (AHS) funded by the U.S. Department of Housing and Urban Development (HUD) and the U.S. Census Bureau which asks: “*In a typical year, about how much does your household spending for routine repairs and maintenance, such as painting, plumbing, roofing, or other minor repairs?*”. The variable within AHS Codebook is MAINTAMT⁸ where a numeric response between \$0 and \$99,998 is entered by respondents. Additionally, AHS already calculates a housing-unit survey weight (WEIGHT within the AHS Codebook) and a variable determining if the respondent’s resident is owner-occupied (TENURE within the AHS Codebook). Approximately 11% of the weighted owner-occupied universe did not report maintenance spending, so, reported totals were adjusted to account for this. Equation 2 details this calculation for each respondent, i , for a given year, t :

$$M_t^{adjusted} = \left[\sum_{\substack{i: TENURE_i=1 \\ MAINTAMT_i \geq 0}} WEIGHT_i * MAINTAMT_i \right] * \frac{\sum_{i: TENURE_i=1} WEIGHT}{\sum_{\substack{i: TENURE_i=1 \\ MAINTAMT_i \geq 0}} WEIGHT} \quad (2)$$

The adjustment assumes that owner-occupied units not reporting maintenance spending have the same weighted average maintenance expenditure as reporting owner-occupied units. Since the survey question within AHS asks for a “typical year”, it is still useful for constructing these weights even though it is not identical to an actual calendar-year expenditure flow since the improvement investment spending from BEA can be calculated annually. Pairing it with the corresponding BEA annual value is therefore an approximation used to establish relative expenditure shares, not an exact temporal match.

Table 1 details each AHS survey-year estimate (i.e., $MAINTAMT_t^{adjusted}$) with the corresponding BEA’s published annual current-dollar improvements value for that same year. When averaged across all five years, the rounded average is 77% for improvements and 23% for maintenance, which is roughly in line with the initial estimation (80%/20%).

⁸ https://www2.census.gov/programs-surveys/ahs/2023/2023_AHS_Items_Booklet.pdf

Table 1: Weight Calculations Using BEA Improvements and AHS⁹

Survey year	BEA Improvements	AHS maintenance, adjusted	Improvement share	Maintenance share
2015	\$197.4B	\$64.5B	75.4%	24.6%
2017	\$238.3B	\$67.1B	78.0%	22.0%
2019	\$265.9B	\$73.9B	78.3%	21.7%
2021	\$329.9B	\$85.2B	79.5%	20.5%
2023	\$362.9B	\$117.6B ¹⁰	75.5%	24.5%
Simple five-year average			77.3%	22.7%

One potential limitation with the AHS data is that it is only for owner-occupied homes while its PPI proxy does include rental properties as part of its calculation. Anecdotally, owner-occupied housing represents a major portion of the remodeling/repair market, which makes this is less of a concern, especially since this composite index is meant to be a proxy. Another limitation is that AHS is biennial which means that the weights would not be updated frequently. When viewing Table 1, the percentage shares are relatively stable over time, so, the 77%/23% weights will remain fixed between formal methodological reviews. NAHB will reconsider the weights following a material revision to either component PPI, a substantial change in the AHS maintenance measure, or at least once every five years.

Alternative Data Sources Considered for Weights

Given the previous discussions regarding potential limitations with the data sources, there were alternative data sources that were investigated further when deciding on the weights for each PPI measurement. First, for maintenance (WPUIP232100), within the personal consumption expenditures (PCE) table of GDP report, there is a line-item for household maintenance¹¹. Table 2 performs the same calculations as Table 1 but replaces the third column in the table with this line-item for household maintenance from the GDP report.

⁹ Data was retrieved as of September 2026.

¹⁰ Starting in 2023, the upper bound was changed to \$99,998 from \$9,998 in the previous surveys. A sensitivity test was performed which capped any respondents in 2023 at \$9,998 for a harmonized approach. While there was an 11% reduction in the total spending figure (from \$117.6B to \$105.2B), there was no meaningful change in the weight (24.5% to 22.5%). As a result, it was determined not to change the original calculation of maintenance spending in Table 1 for 2023. For reference, here is a link to the 2021 AHS Handbook:

<https://www2.census.gov/programs-surveys/ahs/2021/2021%20AHS%20Items%20Booklet.pdf>

¹¹ Specifically, it is Line 327 from Table 2.4.5U. Personal Consumption Expenditures by Type of Product

Table 2: Weight Calculations Using BEA Improvements and Household Maintenance¹²

Survey year	BEA Improvements	BEA Household Maintenance	Improvement share	Maintenance share
2015	\$197.4B	\$78.4B	71.6%	28.4%
2017	\$238.3B	\$78.8B	75.2%	24.8%
2019	\$265.9B	\$91.1B	74.5%	25.5%
2021	\$329.9B	\$97.2B	77.2%	22.8%
2023	\$362.9B	\$110.5B	76.7%	23.3%
Simple five-year average			75.0%	25.0%

When averaged across all five years, the rounded average is 75% for improvements and 25% for maintenance, which is not dissimilar to what was calculated in Table 1. However, there are multiple issues that arise with utilizing this data source. First, while the current National Income & Product Accounts (NIPA) methodology does describe maintenance and repairs as part of the aggregate housing-expense estimates (i.e., Housing Services), the collection of expenditures within household maintenance includes domestic services (i.e., cleaning) and appliance repair which do not have an analogous connection with the PPI measurement. Second, household maintenance is under one GDP component (i.e., PCE, or consumer spending) while improvements is under another (i.e., investment).

BEA does include maintenance and repairs among the expenses used to estimate housing-sector income, but its published NIPA tables do not provide a separate quarterly maintenance-and-repair expenditure series comparable to the improvements series. BEA's methodology indicates that the underlying expense allocations rely partly on unpublished source data and judgmental trends¹³. Given all these reasons, BEA's Household Maintenance is not a suitable alternative.

For improvements (WPUIP231130), as mentioned previously, the construction spending which is published by the U.S. Census Bureau does calculate improvement spending similarly in theory to its corresponding PPI measurement as a residual from residential construction (i.e., total spending minus single-family spending minus multifamily spending). Table 3 performs the same calculations as Table 1 but replaces the second column in the table with this remodeling spending data from the U.S. Census.

¹² Data was retrieved as of September 2026.

¹³ <https://www.bea.gov/resources/methodologies/nipa-handbook/pdf/chapter-12.pdf>

Table 3: Weight Calculations Using U.S. Census Construction Spending and AHS¹⁴

Survey year	Census Improvements	AHS maintenance, adjusted	Improvement share	Maintenance share
2015	\$148.5B	\$64.5B	69.7%	30.3%
2017	\$194.8B	\$67.1B	74.4%	25.6%
2019	\$184.4B	\$73.9B	71.4%	28.6%
2021	\$269.2B	\$85.2B	76.0%	24.0%
2023	\$330.7B	\$117.6B	73.8%	26.2%
Simple five-year average			73.0%	27.0%

When averaged across all five years, the rounded average is 73% for improvements and 27% for maintenance, which is not dissimilar to what was calculated in Table 1. From a methodological perspective, even though the calculation of remodeling spending from the Construction Put-in-Place is aligned with how the PPI measurements are calculated, the BEA approach (i.e., improvement category from Table 5.4) is better aligned with a broadly defined national remodeling market since WPUIP231130 does not expressly restrict to owner-occupied properties. The Census measure offers consistent tenure coverage with the AHS maintenance estimate because both principally represent owner-occupied properties. Nevertheless, it was decided to prioritize the relationship between each expenditure weight and the activity measured by its corresponding PPI, rather than requiring the two weighting sources to have identical tenure coverage.

The alternative specifications produced improvement weights ranging from 73% to 77%. Although the precise weight is sensitive to the data source, all specifications assign a substantial majority of the composite to improvements and support a weight reasonably close to the initial 80%/20% expectation.

Model Specification

Upon identifying the appropriate PPI measurements and data sources for calculating, the model specification for the RIPI is Equation 3:

$$RIPI_t = 0.77 * PPII_t + 0.23 * PPIM_t \quad (3)$$

Given the fact that the underlying PPI measurements are not seasonally adjusted, so, RIPI will be calculated as a year-over-year change as seen in Equation 4:

$$\Delta RIPI\% = \left(\frac{RIPI_t}{RIPI_{t-12}} - 1 \right) * 100 \quad (4)$$

¹⁴ Data was retrieved as of September 2026.

Comparative Testing

Comparing RIPI to Net Inputs to Residential Construction

When analyzing RIPI to net inputs to residential construction (WPUIP231100) back to December 2014 (i.e., the start of the series), the Pearson correlation coefficient is extremely high ($\rho = 0.9991$) using 12-month percentage changes. Their changes differ by an average of 0.3 percentage points in absolute terms, while the maximum difference is 1.7 percentage points. Although RIPI and the broader residential-construction index generally provide similar signals, these divergences demonstrate that their readings can differ meaningfully during certain periods. Thus, it supports the potential incremental value of a remodeling-specific measure, although RIPI's principal justification remains its targeted scope and transparent weighting methodology.

Thus, RIPI should be paired with an update on the labor market from a remodeling perspective would still provide a valuable resource to the marketplace and continue to position NAHB Economics as a leader within the remodeling space (See 'Final Output' section). Therefore, the justification is more aligned with NAHB's Strategic Plan¹⁵ Goal of Public Perception and providing additional resources to the remodeling industry.

Limitations: What RIPI Is Not

While RIPI will serve a vital purpose, it is important to stipulate its limitations. RIPI does not provide a fully comprehensive understanding of the total costs associated with remodeling projects. As a result, it would be imprudent to conclude that the analysis derived from RIPI will provide remodelers with the ability to estimate their project costs. Additionally, it is important to note that both PPI measurements exclude labor, capital investment, and imports, which is why there is emphasis on input prices rather than total remodeling project costs or contractor selling prices.

Therefore, explicit language should be included in any publication material, such as the following.

RIPI measures changes in selected nonlabor input prices associated with residential remodeling and repair. It is not a measure of total project costs, contractor bids, or prices charged to customers.

¹⁵ <https://www.nahb.org/-/media/NAHB/nahb-community/docs/nahb-governance-and-leadership/nahb-strategic-plan.pdf?rev=3d653dedbd4f4f658176372cb878a980&hash=177FD2BFA63E88FDCCA1FE6210BEEC31>

Final Output

The final output for RIPI will be a quarterly blog post on Eye on Housing along with a remodeling labor market update, which will include data on the employed remodelers and average weekly wages from the BLS's Current Employment Statistics (CES). The purpose of this quarterly blog post will be to provide an overall economic update to the remodeling industry. BLS does not publish a statistically reliable CPS unemployment rate specifically for residential remodelers (NAICS 236118); therefore, an industry-specific unemployment rate will not be included.

Conclusion

Given the current prospects and expected future growth for this sector, it is important for NAHB to provide insights to help the industry better understand the current cost pressures. RIPI will also further solidify NAHB Economics as a thought leader in the marketplace when it comes to remodeling resources.

Appendix: Analyzing Rental Tenure

As mentioned previously, there is a . Even though the total amount of remodeling spending is lower for renter occupied than it is for owner occupied, it is a useful exercise to verify that the weights for renter occupied properties are similar.

Utilizing data from the Rental Housing Finance Survey (RHFS)¹⁶, there are two variables which correspond to the PPI measurements: 1) total value of capital improvements per housing unit and 2) property maintenance cost per housing unit. The RHFS is published triennial starting in 2012. Appendix Table 1 takes the average dollar amount for each variable and calculating its respective share across the five survey years. Using a simple average over this period, the improvement to maintenance ratio is approximately 2:1.

Appendix Table 1: Weight Calculations Using Averages of Total Value of Capital Improvements and Property Maintenance Cost per Housing Unit

Survey year	Improvements	Maintenance	Improvement share	Maintenance share
2012	\$2,499	\$1,095	69.5%	30.5%
2015	\$3,110	\$1,374	69.4%	30.6%
2018	\$2,572	\$1,640	61.1%	38.9%
2021	\$3,704	\$1,940	65.6%	34.4%
2024	\$4,952	\$2,777	64.1%	35.9%
Simple five-year average			65.9%	34.1%

Additionally, when respondents answered each survey question, they were able to choose between categorical options with stated ranges. Appendix Table 2 calculates the summation of each variable's options across their lower bound, midpoint, and upper bound for a given year, takes the average dollar amount across these three bounds for each variable and year, and calculates its respective share across the five survey years. Similar to the results from Appendix Table 1, the improvement to maintenance ratio is still approximately 2:1, albeit lower.

¹⁶ <https://www.census.gov/programs-surveys/rhfs.html>

Appendix Table 2: Weight Calculations Using Lower, Midpoint, & Upper¹⁷ Bound Averages of Total Value of Capital Improvements and Property Maintenance Cost per Housing Unit

Survey year	Improvements	Maintenance	Improvement share	Maintenance share
2012 ¹⁸	\$5.2M	\$2.8M	65.1%	34.9%
2015	\$100.5M	\$59.3M	62.9%	37.1%
2018	\$101.5M	\$66.1M	60.6%	39.4%
2021	\$113.3M	\$68.2M	62.4%	37.6%
2024	\$155.0M	\$88.6M	63.6%	36.4%
Simple five-year average			62.9%	37.1%

While the weights are somewhat lower than what was calculated for RIPI as seen in Equation 3, this further analysis of RHFS data validates the overall approach that the improvement proxy should be weighted more heavily than the maintenance proxy, regardless of tenure.

¹⁷ For both variables, there is open-ended upper bound; for capital improvements, it is ‘15000 or more’ and for property maintenance, it is ‘5000 or more’. To determine values for midpoint and upper bounds, I capped the most extreme ten times larger than the lower bound; for capital improvements, it is 150,000 and for property maintenance, it is 50,000.

¹⁸ The 2012 survey only included multifamily rental properties. All subsequent surveys included single-family rental properties, which is the reason for the discrepancy in the dollar level amount. For more information, please visit this link: <https://www.census.gov/programs-surveys/rhfs/about.html>