

THE APEC II STUDY: ESTIMATING AND VALIDATING STATISTICAL MODELS FOR UPDATING NATIONAL ESTIMATES OF IMPROPER PAYMENTS IN THE SCHOOL MEAL PROGRAMS (SUMMARY)

Overview

Federal law – most recently the Improper Payments Elimination and Recovery Act of 2010 – requires USDA’s Food and Nutrition Service (FNS) and other agencies to identify and reduce improper payments in their programs. The second *Access, Participation, Eligibility, and Certification* (APEC II) study produced national estimates of improper payments for the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) for School Year (SY) 2012-2013 using a nationally representative sample of students drawn from a number of School Food Authorities (SFAs) and schools across the country.

For previous APEC studies, statistical models were also developed to estimate national improper payments due to certification error (students are certified for the incorrect meal reimbursement category) on an annual basis using district-level data available from the Verification Collection Report (VCR). This enabled FNS to update its estimates of national improper payment rates for school meals in future years without having to conduct primary data collection.

The APEC II models refine those previously developed for the APEC I study by including estimates of improper payments in schools participating in the Community Eligibility Provision (CEP) and improper payments due to meal-claiming error, which occurs when the incorrect numbers of meals are reported for reimbursement to FNS. The resulting models estimate improper payments due to certification error in non-CEP schools, certification error in CEP schools, and meal-claiming error in both non-CEP and CEP schools. These estimates were compared to the APEC II estimates of error generated from a nationally representative sample to assess their precision.

Methodology

The statistical models were developed and validated through a multi-step process:

1. **Gather relevant data:** In addition to the study data used to estimate district-level improper payment rates, national data sources provide information on district characteristics, school meal program policies, and local economic conditions. These data sources include the VCR, the Common Core of Data, the Private School Survey, Census Small Area Income and Poverty Estimates, and Local Area Unemployment Statistics.
2. **Determine the best estimation models:** Different model systems with various estimation techniques were identified.
3. **Select explanatory variables:** Variables were selected based on their strong theoretical relationship with certification error rates and their potential responsiveness to changes in district policies. These factors must also be available from timely data sources that cover all districts nationwide and can be merged with other included data sources.
4. **Select the best performing model:** After estimating a wide range of model types, each with different sets of explanatory variables, a model was selected based on the ability to generalize from its results and its fit with the APEC II data in the regression equations.
5. **Validate the model:** After selecting the preferred model for each type of error, the models were applied to national data for SY 2012–2013 to estimate national improper payment rates. These model estimates were then assessed on how well they performed compared with the sample-based estimates.

Results

The models allow for district-level improper payment estimates to be summed in order to generate national improper payment rate estimates. When compared with the APEC II estimates, all of the model-based estimates are very similar, falling within the 95-percent confidence interval for each model.

Figure 1: National NSLP Improper Payment Estimates Based on the APEC II Statistical Models versus APEC II Estimates, SY 2012–2013

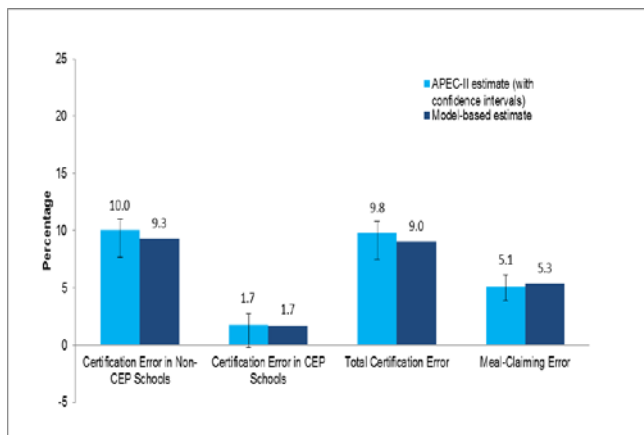
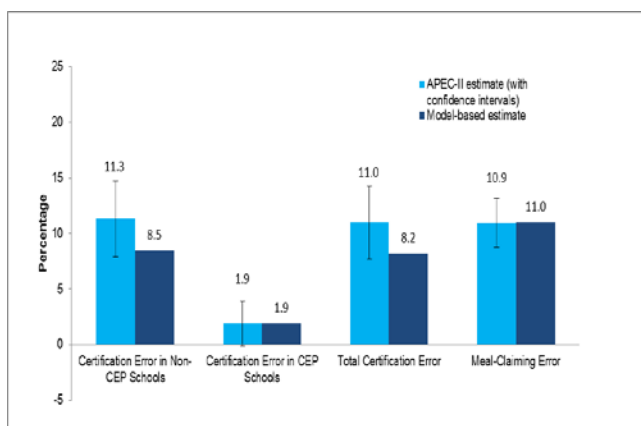


Figure 2: National SBP Improper Payment Estimates Based on the APEC II Statistical Models versus APEC II Estimates, SY 2012–2013



Certification in non-CEP schools: For both the NSLP and the SBP, the model predictions for overpayment, underpayment, and total improper payments are slightly less but not statistically different than those from the APEC II study.

Certification in CEP schools: For the NSLP, model-based estimates of gross improper payments due to CEP certification error were 1.71 percent of total reimbursements, compared to 1.73 percent of total reimbursements in the study. For the SBP, model-based estimates of gross improper payments related to CEP certification error were 1.87 percent of total reimbursements, compared to 1.88 percent of total reimbursements in the study.

Meal-Claiming Errors: For both the NSLP and the SBP, the model predictions for overpayment,

underpayment, and total improper payments are slightly greater but not statistically different than those from the APEC II study.

Summary

Despite improvements to the model development process, key limitations of the modeling approach remain. There was still a substantial amount of variation in improper payment rates that was unexplained by the models. Specifically, there were unobserved factors that cause certification error rates to be higher in some districts than in others. To the extent that changes in these unobserved factors also lead to changes in improper payments in future years, the model may not capture these changes.

Using a statistical model based on estimated relationships between district characteristics and certification and non-certification error rates in SY 2012–2013 to predict improper payments in the future implicitly assumes that these relationships remain constant over time. This is a reasonable assumption over a limited number of years, but will need to be re-validated periodically and adjusted as needed.

Lastly, the CEP modeling is hampered by limited availability of national data related to CEP, such as CEP reimbursements, implementation features, and meal-claiming rates. The reliability of the CEP certification error estimates may be further compromised by the fact that the CEP models were estimated using districts in States that had implemented CEP in SY 2012–2013. CEP became available nationwide starting in SY 2014–2015. Districts within the States that elected to use CEP in SY 2012–2013 may differ from typical districts nationally. As a result, the relationships estimated in the CEP models may change, making the model-based improper payment estimates less accurate.

For More Information

Wu, A.Y. and Moore, Q. (2016). *The APEC II Study: Estimating and Validating Statistical Models for Updating National Estimates of Improper Payments in the School Meal Programs*. Prepared by Mathematica Policy Research. Alexandria, VA: USDA, Food and Nutrition Service. Project Officer: Chan Chanhathasilpa. This report is available online at:

<http://www.fns.usda.gov/ops/research-and-analysis>.