

# Online Appendix

## Consumption Volatility, Marketization, and Expenditure in an Emerging Market Economy

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### Abstract

This appendix presents additional results that are referred to in the main text.

### **A: Price Changes in Mexico Over Time**

Appendix Table A1 presents the official CPI for Mexico broken down by expenditure category over the sample period of the ENIGH surveys used in the main analysis. Each column presents the average annual inflation rate between each pair of the ENIGH survey waves. As can be seen from the table, price changes were sizeable during the first half of the study period, but moderated noticeably in the second half. During the Peso Crisis period from 1994-1996, inflation averaged over 2.5% a month - yielding an 86.5% increase in prices in just two years. Prices for food more than doubled.

The analysis presented in the main paper primarily focuses on fluctuations in food expenditures. While price changes differed some across broad expenditure categories presented in Table A1, they likely varied much less within these categories. Price fluctuations are likely an important source of incentives and a worthwhile avenue for future research, but one which introduces several additional challenges. In particular, the analysis of the role of price changes is complicated the endogenous nature of prices, which are affected by demand, by consumers' ability to substitute own time for market inputs, and by consumer search time as described in McKenzie and Schargrodsky (2011).

**Appendix Table A1: Annual Inflation Between ENIGH Survey Waves**

| Period  | 1984 -<br>1989 | 1989 -<br>1992 | 1992 -<br>1994 | 1994 -<br>1996 | 1996 -<br>1998 | 1998 -<br>2000 | 2000 -<br>2002 | 2002 -<br>2004 | 2004 -<br>2005 | 2005 -<br>2006 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| General Index                                   | 75%            | 21%            | 8%             | 37%            | 17%            | 12%            | 6%             | 5%             | 4%             | 4%             |
| Expenditure Category                            |                |                |                |                |                |                |                |                |                |                |
| Foods, drinks and tobacco                       | 75%            | 18%            | 6%             | 43%            | 17%            | 10%            | 5%             | 6%             | 5%             | 5%             |
| Clothes, footwear and accessories               | 71%            | 14%            | 6%             | 34%            | 18%            | 12%            | 4%             | 1%             | 1%             | 1%             |
| Housing   | 78%            | 29%            | 10%            | 31%            | 17%            | 12%            | 6%             | 5%             | 2%             | 4%             |
| Furniture, household appliances and accessories | 70%            | 13%            | 6%             | 42%            | 16%            | 12%            | 0%             | 0%             | 2%             | 2%             |
| Health and personal care                        | 75%            | 21%            | 10%            | 39%            | 18%            | 16%            | 6%             | 4%             | 4%             | 3%             |
| Transport                                       | 73%            | 26%            | 8%             | 38%            | 20%            | 14%            | 5%             | 3%             | 3%             | 4%             |
| Education and entertainment                     | 78%            | 26%            | 14%            | 30%            | 16%            | 15%            | 10%            | 5%             | 5%             | 5%             |
| Other services                                  | 84%            | 20%            | 8%             | 29%            | 18%            | 15%            | 9%             | 5%             | 5%             | 4%             |

Notes: The data for this table were drawn from Bank of Mexico. Series: Índice nacional de precios al consumidor (mensual), Índice general y por objeto del gasto, Base 2002 = 100. Annualized changes are calculated using the September value for each survey year.

## **B: Robustness and Specification Checks**

### *B1 – Robustness for Section 3.2*

Appendix Table B1 explores the robustness of the results presented in Table 2 to alternative specifications. Columns (1) and (2) estimate the relationship between an indicator for positive expenditure and income without instrumentation, using OLS and Probit specifications respectively. Panel A again compares substitution across broad food categories while Panel B examines the relationship between income and expenditure across varying levels of marketization for tortilla consumption. Although the quantitative magnitudes of the coefficients differ slightly, the qualitative relationship across degrees of marketization stays the same. Column (3) presents Tobit results, this time as the marginal effect for households with positive expenditure on a specific commodity. The estimated patterns are similar to those presented in the main text and consistent with richer households having substituted more market inputs in place of own time in food consumption.

### *B2 – Robustness for Section 4.2*

Table 6 in the main text is calculated for the subset of households with positive food expenditures and non-zero time use only. These results may be misrepresentative when considering aggregate volatility if there are a large number of households with no market expenditure on meals outside of the home. Furthermore, this may be a larger issue in the Mexican context than in the U.S., leading the U.S. estimates to be potentially more accurate (or more representative) than those for Mexico. To address this concern, Appendix Table B2 estimates the relationship without logging time use or food expenditure, in order to include households with values of zero.

As in Table 6, these estimates have already been made as comparable as possible by deflating pesos and dollars to December 1999, a month during which the exchange rate averaged approximately 10 pesos to the dollar and by comparing the impact of a 1000 peso unit change in expenditure with that of a \$100 change. For a given expenditure reallocation, the estimated time use reallocations are significantly larger in Mexico (p-value of 0.014). This is consistent with the implied time reallocations of the elasticities presented in Table 6 and discussed in the text. Throughout the manuscript, I estimate the scope for differences in marketization bias between the two settings assuming similar elasticities. In this regard, the larger estimates for Mexico may be seen as a lower bound, and a valuable potential avenue for future research may be to precisely estimate non-market elasticities in other contexts.

Finally, it would be preferable to control for total expenditure in these regressions, as opposed to income, since the former is typically more accurately measured in household surveys. However, total expenditure is not available in the ATUS-CPS-FSS data and so I opt for income in the main table for this reason. As a robustness check, re-estimating equation (11) with total expenditure as a control in Mexico yields very similar results (not shown).

### *B3 – Robustness for Section 4.4*

A potential concern for the analysis in Table 8 of the main text is that the results are specific to the time period in question. Appendix Table B3 exploits additional data for the U.S. to explore the robustness of these results to alternative sets of survey dates. Over the two decade period included in Table 8, volatility is quite high in Mexico and rather low in the U.S. Appendix Table B3, column (1) shows that extending the time frame to include the years of the Great Recession results in a slight increase in the standard deviation of aggregate consumption, but paints a similar picture of the underlying sources of volatility in the U.S.

Similarly, the frequency of CEX surveys exceeds that of ENIGH surveys over the sample period in Table 8, which could be a concern if one sample more accurately captured the dynamics of consumption expenditure. Appendix Table B3, column (2) restricts the analysis to the exact subset of corresponding CEX survey years which temporally correspond to Mexico's ENIGH survey waves. This exercise yields a lower aggregate level of volatility for the U.S., but again reveals a similar role for the underlying drivers of volatility in the economy suggested by Table 8.

## Appendix Table B1: Robustness Checks for Table 2

| Degree of<br>Marketization | Market<br>Expenditure | Dep Var: Ind for Pos Expend |               | Dep Var: Expend |
|----------------------------|-----------------------|-----------------------------|---------------|-----------------|
|                            |                       | OLS<br>(1)                  | Probit<br>(2) | Tobit MV<br>(3) |

**Panel A:** Substitution across broad food categories by level of marketization

|      |                   |                      |                      |                    |
|------|-------------------|----------------------|----------------------|--------------------|
| Low  | Food In           | -0.011***<br>(0.002) | -0.005***<br>(0.001) | 40.91***<br>(2.16) |
| High | Prepared<br>Foods | 0.068***<br>(0.005)  | 0.074***<br>(0.006)  | 1.98***<br>(0.22)  |
| High | Food Out          | 0.166***<br>(0.005)  | 0.183***<br>(0.006)  | 25.84***<br>(1.07) |

**Panel B:** Substitution across levels of marketization in tortilla consumption expenditure

|        |                      |                      |                      |                    |
|--------|----------------------|----------------------|----------------------|--------------------|
| Low    | Corn Grain           | -0.073***<br>(0.003) | -0.055***<br>(0.003) | -1.83***<br>(0.24) |
| Medium | Nixtamal<br>Services | -0.038***<br>(0.003) | -0.020***<br>(0.001) | -0.56***<br>(0.09) |
|        | Corn Meal<br>& Dough | -0.025***<br>(0.003) | -0.025***<br>(0.003) | -0.33***<br>(0.04) |
| High   | Tortillas            | 0.060***<br>(0.005)  | 0.045***<br>(0.005)  | -0.97***<br>(0.09) |

Notes: The data for this table were drawn from biennial ENIGH surveys between 1992 and 2004. The sample is restricted to households with heads aged 35-50. Coefficients reported in columns (1) and (2) are from separate regressions of an indicator for positive quarterly expenditure in the food category listed on log quarterly household income. Coefficients reported in column (3) are from separate regressions of quarterly expenditure in the food category on quarterly household income (in thousands of pesos). The number of observations ranges from 36,603 to 37,153 depending on the specification. All regressions include controls for household head gender, adult equivalent household size, numbers of men, women, young age dependents, and old age dependents in the household, an indicator for whether the household is urban, and indicators for survey year. Income and expenditure include both monetary and nonmonetary flows with the top 1% of values trimmed, and are converted to December 1999 pesos. Regressions are survey weighted and robust standard errors are reported. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. See Table 2 for means and standard deviations (where informative) of the dependent variables.

## Appendix Table B2: Robustness Checks for Table 6

|  | Dep Var: Minutes Spent in Food Preparation and Cleanup |                         |                         |                  |                       |                       |
|--|--|-------------------------|-------------------------|------------------|-----------------------|-----------------------|
|  | Mexico   |                         |                         | United States    |                       |                       |
|  | (1)  | (2)                     | (3)                     | (4)              | (5)                   | (6)                   |
| Food expenditure for home<br>(‘000s of 1999 Pesos, \$100s of 1999 USD) | -30.874<br>(28.136)                                    |                         | -43.185<br>(28.218)     | 4.631<br>(4.254) |                       | 12.080**<br>(4.796)   |
| Food expenditure out<br>(‘000s of 1999 Pesos, \$100s of 1999 USD)      |  | -151.215***<br>(29.211) | -158.033***<br>(30.031) |                  | -33.585***<br>(6.178) | -36.441***<br>(6.228) |
| Number of observations   | 8,967  | 8,994                   | 8,925                   | 27,772           | 19,298                | 19,298                |
| R2   | 0.200  | 0.205                   | 0.205                   | 0.148            | 0.140                 | 0.140                 |

Mexico Notes: Data for Mexico were drawn from a merged ENIGH-ENUT database for 1996 and 2002. The sample is restricted to households with heads aged 25-80. Coefficients reported are from OLS regressions of household time spent in food preparation and cleanup on weekly expenditures listed in the table, and the controls listed in the notes for Table 6. Expenditure and income include both monetary and nonmonetary flows with the top 1% of values trimmed, and are converted to weekly December 1999 pesos. The top 1% of values for the time use data are trimmed.

US Notes: Data for the US were drawn from a merged ATUS-CPS-FSS databased for the period 2003-2011. The sample is restricted to households where the ATUS respondent was aged 25-80. Coefficients reported are from OLS regressions of household time spent in food preparation and cleanup on weekly expenditures listed in the table, and the controls listed in the notes for Table 6. Expenditure and income information are converted to December 1999 dollars. Time use has been scaled to the weekly household level for comparison with the ENIGH estimates, and the top 1% of values are trimmed.

Overall Notes: Regressions are survey weighted, and robust standard errors are reported. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Appendix Table B3: Robustness Checks for Table 8

| <b>Panel A: Overall Volatility</b>                               |                            |   |
|--|----------------------------|---|
|  | 1984-2011<br>Annual<br>(1) | 1984-2006<br>Matched ENIGH Waves<br>(2) |
| Standard deviation of the growth rate of consumption expenditure | 1.9%                       | 1.2%                                    |
| <b>Panel B: Share of Expenditure Volatility by Commodity</b>     |                            |   |
| Types of Expenditure   |                            |   |
| Durable goods  | 30.0%                      | 18.5%                                   |
| Non-durable goods  | 29.2%                      | 29.6%                                   |
| Services   | 42.4%                      | 51.1%                                   |
| Expenditures with Potential for Nonmarket Substitution           |                            |   |
| Food and alcohol   | 12.3%                      | 6.2%                                    |
| Food consumed at home  | 1.9%                       | -5.3%                                   |
| Food consumed out  | 9.2%                       | 12.8%                                   |
| Domestic service   | 0.2%                       | 0.5%                                    |
| Household operation services                                     | 1.6%                       | 0.3%                                    |
| Primary/infant care  | 1.5%                       | 3.0%                                    |
| Personal care services   | 1.2%                       | 2.1%                                    |
| Recreational services  | 2.6%                       | 4.4%                                    |
| All 5 (non-food) expenditure categories                          | 7.0%                       | 10.2%                                   |

Notes: Estimates are based on author's calculations from CEX Surveys over the sample period. The covariance decomposition method is an approximation, and aggregating shares of total volatility across individual components will not sum perfectly to 100 percent. See text for additional details.