

# Price Indexes from online data using the fixed-effects window-splice (FEWS) index

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# Introduction

- ◎ Webscraped online data offers potential for very timely and high-frequency price measurement
- ◎ But online data lacks characteristics and quantities
- ◎ The fixed-effects window-splice (FEWS) index produces fully quality-adjusted non-revisable indexes despite no characteristics
- ◎ We simulate the effect of no quantities using scanner data for consumer electronics and supermarket products

## The FEWS index

- ⊙ The FE (aka ‘time-product dummy’) index is equivalent to a fully-interacted time-dummy hedonic index when characteristics are expressed as categorical (Krsinich, 2014)

$$P_{FE}^{0t} = \exp(\hat{\delta}^t) = \frac{\prod_{i \in S^t} (p_i^t)^{\frac{1}{N^t}}}{\prod_{i \in S^0} (p_i^0)^{\frac{1}{N^0}}} \exp[\bar{\gamma}^0 - \bar{\gamma}^t]$$

$$P_{TD_{full}}^{0t} = \exp(\hat{\delta}^t) = \frac{\prod_{i \in S^t} (p_i^t)^{\frac{1}{N^t}}}{\prod_{i \in S^0} (p_i^0)^{\frac{1}{N^0}}} \exp \left[ \sum_{l=1}^L \hat{\beta}_l (\bar{D}_l^0 - \bar{D}_l^t) + \sum_{m=1}^M \hat{\beta}_m (\bar{D}_m^0 - \bar{D}_m^t) \right]$$

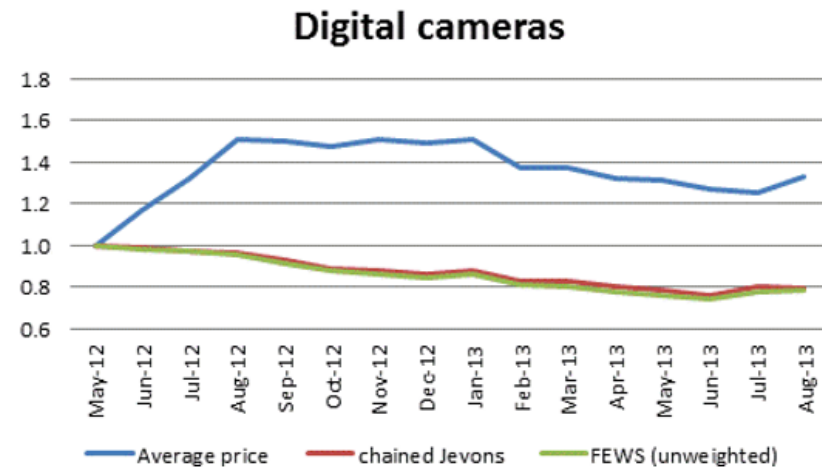
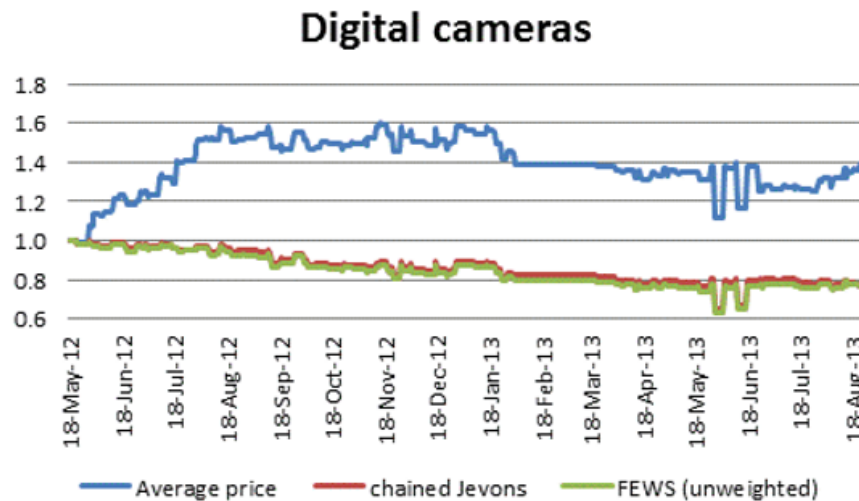
## The FEWS index

- ⊙ New products need at least two observations to be non-trivially included in the FE index.
- ⊙ The window-splice enables implicit revision of the index to reflect new products (and update estimates of fixed-effects)

$$P_{FEMS}^{0,T+1} = P_{FE}^{0,T}(0) \times P_{FE}^{T,T+1}(1) \qquad P_{FEWS}^{0,T+1} = P_{FE}^{0,1}(0) \times P_{FE}^{1,T+1}(1)$$

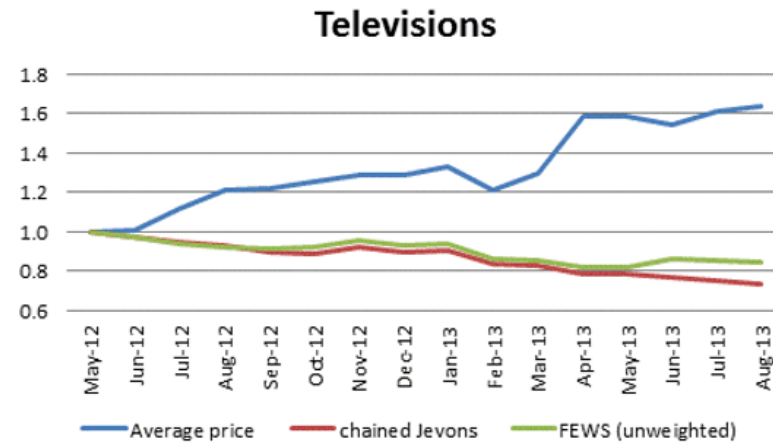
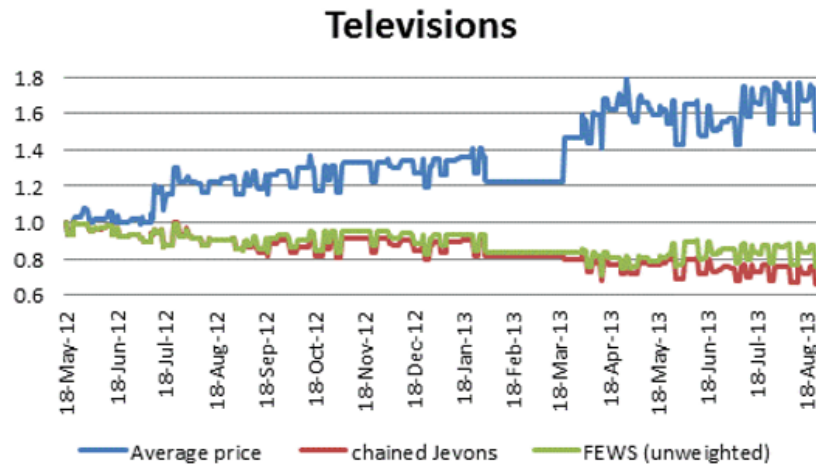
$$P_{FEWS}^{0,T+1} = \frac{P_{FE}^{1,T}(1)}{P_{FE}^{1,T}(0)} \times P_{FEMS}^{0,T+1} \qquad (\text{de Haan, 2015})$$

# BPP daily online data



Chained Jevons vs unweighted FEWS:  
The impact of reflecting implicit price movements of new/disappearing products

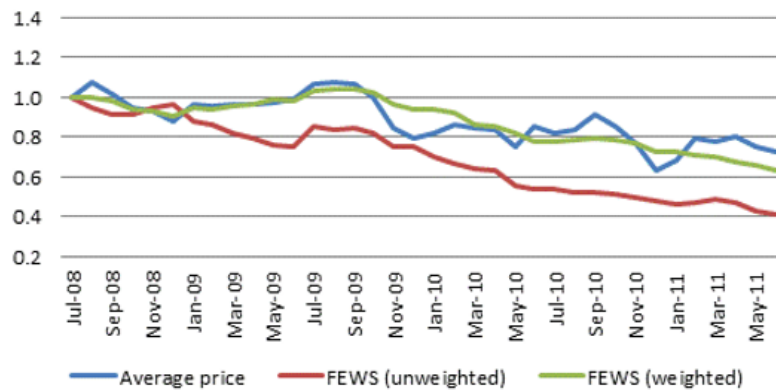
# BPP daily online data



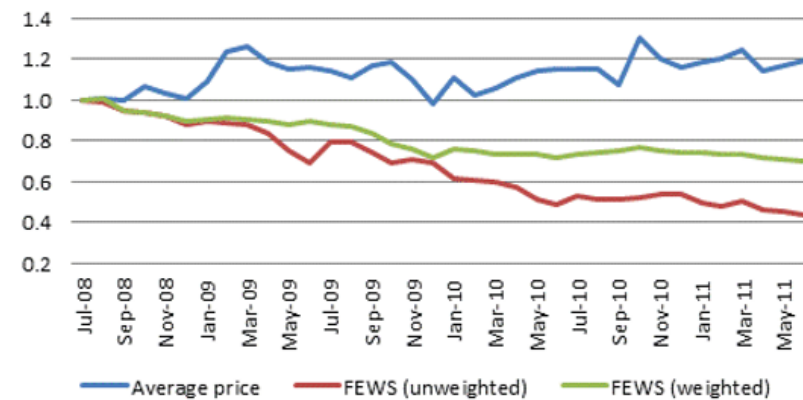
Chained Jevons vs unweighted FEWS:  
The impact of reflecting implicit price movements of new/disappearing products

# GfK monthly scanner data

DVD players and recorders



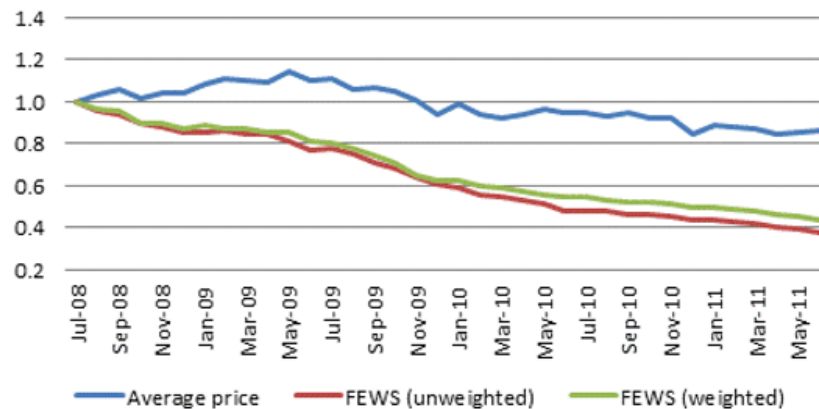
Portable media players



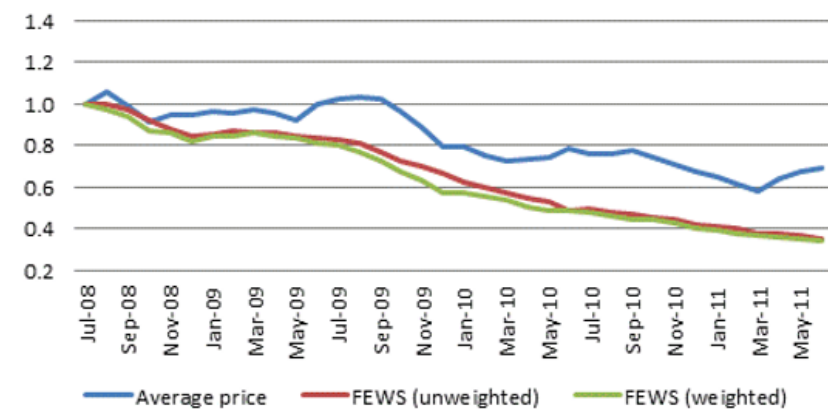
FEWS unweighted vs FEWS weighted:  
The effect of including quantities

# GfK monthly scanner data

### Laptop computers



### Televisions

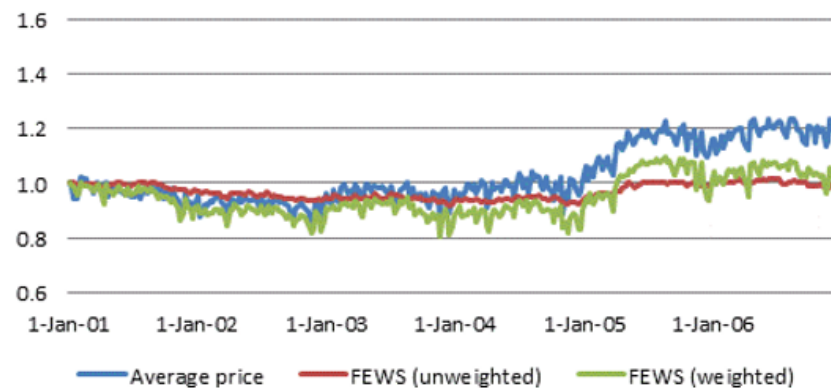


FEWS unweighted vs FEWS weighted:  
The effect of including quantities

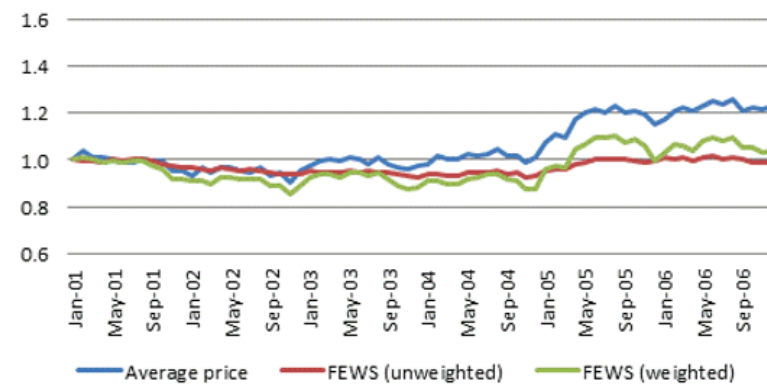


# IRI weekly scanner data

Coffee

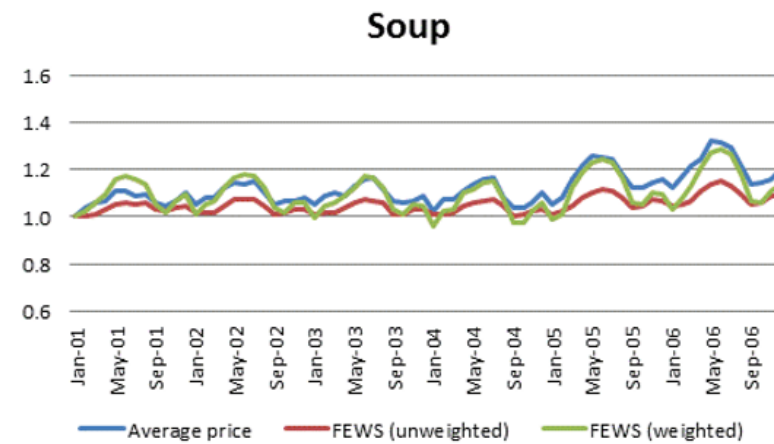
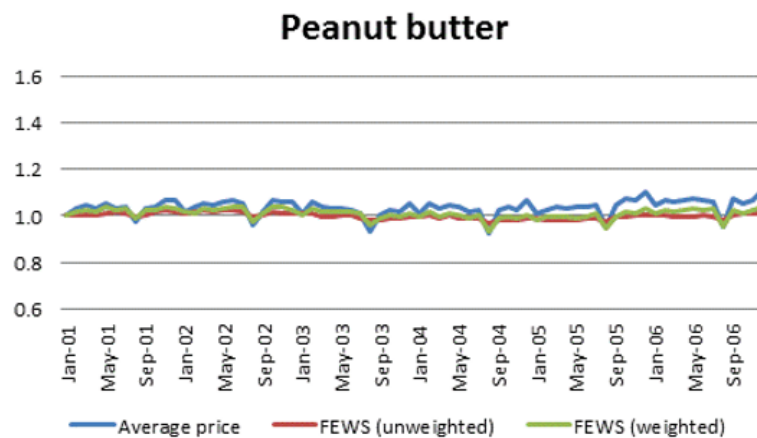


Coffee



FEWS unweighted vs FEWS weighted:  
The effect of including quantities

# IRI weekly scanner data



FEWS unweighted vs FEWS weighted:  
The effect of including quantities

# Conclusion

- ⊙ Much potential from online data, but no characteristics or quantities
- ⊙ FEWS index can produce quality-adjusted indexes despite no characteristics
- ⊙ The effect of quantities varies but not significant for many of the products tested
- ⊙ Potential for using online data in official statistics via a hybrid approach – calibration to less-timely official measures