

Intervention Analysis in Seasonal Adjustment

In some Consumer Price Index (CPI) series, a process known as seasonal adjustment is used to identify and factor out seasonal movements. The resulting seasonally adjusted data reflect an estimate of nonseasonal price movements. The CPI uses the Bureau of the Census X-12-ARIMA software to calculate factors for seasonal adjustment of both historical and current series. Some CPI series are adjusted using the intervention analysis feature of the Census X-12 seasonal adjustment process.

Intervention analysis seasonal adjustment allows nonseasonal economic phenomena, such as outliers and level shifts, to be factored out of indexes before calculation of seasonal adjustment factors. (An *outlier* is an extreme value for a particular month. A *level shift* is a change or shift in the price level of a CPI series caused by an event, such as a sales tax increase or oil embargo, occurring over 1 or several months.) The result is an adjustment based on a representation of the series with the seasonal pattern emphasized. Intervention analysis seasonal adjustment also makes it possible to account for seasonal shifts, resulting in a better seasonal adjustment in the periods before and after the shift occurred. For those CPI series adjusted using intervention analysis seasonal adjustment techniques the resulting seasonal factors better represent the true seasonal pattern than factors calculated without these techniques. The seasonal factors are applied to the original unadjusted series. Level shifts and outliers, removed for the calculation of seasonal factors, are present in the seasonally adjusted series.

When X-12-ARIMA is used to perform intervention analysis seasonal adjustment, unusual events are modeled as part of the seasonal adjustment process. X-12-ARIMA's built-in regression variables are used for directly estimating the effects of sudden level changes and other disruptions and removing those effects before calculation of the seasonal factors. For a comprehensive discussion of X-12-ARIMA and intervention analysis seasonal adjustment, see "Improvements to CPI Procedures for Intervention Analysis Seasonal Adjustment" in the December 1996 issue of the *CPI Detailed Report*.

In January 2007, BLS adjusted the series listed below using intervention analysis seasonal adjustment techniques. BLS examined these series using the 8-year span from January 1999 through December 2006.

Admission to sporting events	Fuel oil and other fuels	New vehicles
Bacon, breakfast sausage, and related products	Gasoline, all types	Nonalcoholic beverages and beverage materials
Beverage materials including coffee and tea	Gasoline, unleaded midgrade	Nondurables less food and apparel
Breakfast sausage and related products	Gasoline, unleaded premium	Nondurables less food, beverages, and apparel
Butter	Gasoline, unleaded regular	Other household fuels
Carbonated drinks	Ice cream and related products	Other poultry including turkey
Dairy and related products	Jewelry	Other processed fruits and vegetables including dried
Educational books and supplies	Jewelry and watches	Other sweets
Electricity	Juices and nonalcoholic drinks	Pork
Fats and oils	Motor fuel	Tomatoes
Fresh vegetables	Moving, storage, freight expense	Utility (piped) gas service
Fuel oil	New cars	
	New cars and trucks	
	New trucks	

For each series that was adjusted using X-12-ARIMA intervention analysis seasonal adjustment, a list of level shifts is provided in the table below, along with the identified causes (events). Outliers are also included in the list.

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Consumer Price Index series – intervention analysis seasonal adjustment

Series	Level shift period(s)	Event	Outliers
Admission to sporting events	4/01	Sharp increase in baseball ticket prices due to the start of the spring season	11/99, 6/05
	3/06-4/06	Large discount for baseball tickets	
	4/06-6/06	Recovery from sale from previous months	
Bacon, breakfast sausage, and related products	1/00-3/00	Response to low pork production	4/05
Beverage materials including coffee and tea	11/04-4/05	Smaller Brazilian coffee crop, rising Brazilian currency	None
Breakfast sausage and related products	1/00-3/00	Response to low pork production	7/02, 2/03, 8/03, 4/05
	6/03	Response to low pork production	
	6/04-8/04	Response to low beef and pork production	
Butter	3/01-7/01	Early year drop in milk production was slow to recover. Demand for dairy products remained strong.	5/99, 2/00
	2/04-6/04	Very low spring stocks of cheese and butter, plus lower production of raw milk	
Carbonated drinks	4/02-6/02	Promotions associated with significant new brand introductions	10/00, 8/01, 7/03
	9/02	Return to normal level of promotions	
Dairy and related products	4/99	Substantial increase in milk production	None
	10/99	Reaction to tight dairy markets, as increases in milk output were absorbed by strong cheese demand	
	3/04-6/04	Rising consumption, inadequate cheese and butter stocks, and very low milk production	
	6/04-9/04	Low demand in response to tight markets, combined with rising production of milkfat products	

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Educational books and supplies	11/99	Greater than normal sale on educational reference books	None
	1/00	Adjustment from greater than normal sale on educational reference books	
	11/01-12/01	Greater than normal sale on educational reference books	
	12/01-2/02	Adjustment from greater than normal sale on educational reference books	
	11/03-12/03	Changes in end of year pricing policies for general reference books	
Electricity	12/05-1/06	Larger than normal increase due to recovery from Hurricane Katrina	6/01, 11/05
Fats and oils	1/99-5/99	Increased domestic and imported oil supply exceeded demand	4/00, 11/00, 4/01, 3/05, 6/05, 4/06
	11/99	Anticipation of larger-than-normal soybean and other crops, coupled with a higher demand for butter	
	6/01	Response to a decrease in domestic milk output, combined with increasing oil demand	
	12/02-2/03	Response to depleted soybean oil stocks from record 2001 domestic crushing and exporting, coupled with increased domestic demand	
	2/04-6/04	Rising prices for butter and salad oils combined with lower output of dairy goods	
	8/04	Response to tight butter and dairy supplies	
Fresh vegetables	9/04-11/04	Damage to tomato crops caused by hurricanes	2/02, 3/02, 4/02, 4/05, 5/05
	12/04-1/05	Recovery of tomato crops	
	8/06-10/06	Hotter than normal temperatures in California reduced tomato supplies	
	10/06-12/06	Recovery of supplies from damage caused by hotter than normal temperatures in California	

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Fuel oil	9/00	Robust economy, low inventory, winter refills, and uncertainty about Middle East supply	2/00, 3/00
	9/01-12/01	Positive storage and inventory build-up because of warmer weather trends and slowing economy	
	2/03-3/03	Low inventories due to rising crude oil prices, political uncertainty within oil supplying regions and Iraq, and increased broad demand for fuels	
	3/03-5/03	End of winter and end of major combat operations in Iraq	
	12/03-1/04	Fuel supply concerns due to Iraq conflict and Venezuela political unrest	
	9/04-11/04	Supply disruptions due to Hurricane Ivan	
	6/05-9/05	Declining oil imports, lack of spare refining capacity, and rising demand for heating fuels followed by Hurricane Katrina supply disruptions	
	8/06-10/06	Supply outpaced demand due to storage buildup from unseasonably mild weather	
	Fuel oil and other fuels	9/00	
9/01-12/01		Positive storage and inventory build-up because of warmer weather trends and slowing economy	
2/03-3/03		Low inventories due to rising crude oil prices, political uncertainty within oil supplying regions and Iraq, and increased broad demand for fuels	
3/03-5/03		End of winter and end of major combat operations in Iraq	
12/03-1/04		Fuel supply concerns due to Iraq conflict and Venezuela political unrest	
9/04-11/04		Supply disruptions due to Hurricane Ivan	
6/05-9/05		Declining oil imports, lack of spare refining capacity, and rising demand for heating fuels followed by Hurricane Katrina supply disruptions	
8/06-10/06		Supply outpaced demand due to storage buildup from unseasonably mild weather	

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Gasoline, all types	4/99	Anticipated cutback of crude oil production by OPEC and other countries	3/00, 8/00, 5/01, 6/01, 9/01
	6/99-9/99	Realized effects of a decrease in supply of crude oil by OPEC and other countries	
	6/00	Effects of implementing a new EPA requirement for reformulated gasoline	
	10/01-12/01	Return to a normal balance of expected supply and demand following a period of speculative supply	
	2/02-4/02	Effect of a significant decrease in imported crude and refined oil	
	12/02-3/03	Anticipation of Iraq war combined with effects of an oil strike in Venezuela	
	3/03-5/03	Oil strike in Venezuela ends, with faster than expected increases in oil supply	
	7/03-9/03	All time record demand for auto fuel, complicated by supply problems due to electrical blackouts at refineries in the Northeast and Midwest during late summer	
	9/03-11/03	Recovering domestic inventories following record high summer demand and refinery problems in the Northeast and Midwest	
	12/03-3/04	Extremely low inventories from refineries plus switch to production of summer blends to meet EPA regulations	
	5/04	Extra cost to refiners due to new environmental regulations, summer gasoline shortage, and continued tension in the Middle East.	
	10/04	Hurricane Ivan disruption effects on refineries in the Gulf of Mexico	
	1/05-4/05	Combined effects of robust global crude oil demand and increasing political uncertainty in Iraq, Venezuela and Nigeria	
	6/05-9/05	Damage to U.S. oil refineries resulting from Hurricane Katrina, along with record global petroleum demand and continued political unrest in Iraq, Venezuela and Nigeria	
	10/05-11/05	Recovery of domestic oil refineries the Gulf of Mexico, combined with easing crude oil prices	
3/06-5/06	World oil market conditions, growth in US demand, and ongoing implementation of domestic fuel quality requirements		
8/06-10/06	Collapse in profit margins for oil refineries		

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Gasoline, unleaded midgrade	4/99	Anticipated cutback of crude oil production by OPEC and other countries	3/00, 8/00, 5/01, 6/01, 9/01
	6/99-9/99	Realized effects of a decrease in supply of crude oil by OPEC and other countries	
	6/00	Effects of implementing a new EPA requirement for reformulated gasoline	
	10/01-12/01	Return to a normal balance of expected supply and demand following a period of speculative supply	
	2/02-4/02	Effect of a significant decrease in imported crude and refined oil	
	12/02-3/03	Anticipation of Iraq war combined with effects of an oil strike in Venezuela	
	3/03-5/03	Oil strike in Venezuela ends, with faster than expected increases in oil supply	
	7/03-9/03	All time record demand for auto fuel, complicated by supply problems due to electrical blackouts at refineries in the Northeast and Midwest during late summer	
	9/03-11/03	Recovering domestic inventories following record high summer demand and refinery problems in the Northeast and Midwest	
	12/03-3/04	Extremely low inventories from refineries plus switch to production of summer blends to meet EPA regulations	
	5/04	Extra cost to refiners due to new environmental regulations, summer gasoline shortage, and continued tension in the Middle East.	
	10/04	Hurricane Ivan disruption effects on refineries in the Gulf of Mexico	
	1/05-4/05	Combined effects of robust global crude oil demand and increasing political uncertainty in Iraq, Venezuela and Nigeria	
	6/05-9/05	Damage to U.S. oil refineries resulting from Hurricane Katrina, along with record global petroleum demand and continued political unrest in Iraq, Venezuela and Nigeria	
	10/05-11/05	Recovery of domestic oil refineries the Gulf of Mexico, combined with easing crude oil prices	
3/06-5/06	World oil market conditions, growth in US demand, and ongoing implementation of domestic fuel quality requirements		
8/06-10/06	Collapse in profit margins for oil refineries		

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Gasoline, unleaded premium	4/99	Anticipated cutback of crude oil production by OPEC and other countries	3/00, 8/00, 5/01, 6/01, 9/01
	6/99-9/99	Realized effects of a decrease in supply of crude oil by OPEC and other countries	
	6/00	Effects of implementing a new EPA requirement for reformulated gasoline	
	10/01-12/01	Return to a normal balance of expected supply and demand following a period of speculative supply	
	2/02-4/02	Effect of a significant decrease in imported crude and refined oil	
	12/02-3/03	Anticipation of Iraq war combined with effects of an oil strike in Venezuela	
	3/03-5/03	Oil strike in Venezuela ends, with faster than expected increases in oil supply	
	7/03-9/03	All time record demand for auto fuel, complicated by supply problems due to electrical blackouts at refineries in the Northeast and Midwest during late summer	
	9/03-11/03	Recovering domestic inventories following record high summer demand and refinery problems in the Northeast and Midwest	
	12/03-3/04	Extremely low inventories from refineries plus switch to production of summer blends to meet EPA regulations	
	5/04	Extra cost to refiners due to new environmental regulations, summer gasoline shortage, and continued tension in the Middle East.	
	10/04	Hurricane Ivan disruption effects on refineries in the Gulf of Mexico	
	1/05-4/05	Combined effects of robust global crude oil demand and increasing political uncertainty in Iraq, Venezuela and Nigeria	
	6/05-9/05	Damage to U.S. oil refineries resulting from Hurricane Katrina, along with record global petroleum demand and continued political unrest in Iraq, Venezuela and Nigeria	
	10/05-11/05	Recovery of domestic oil refineries the Gulf of Mexico, combined with easing crude oil prices	
3/06-5/06	World oil market conditions, growth in US demand, and ongoing implementation of domestic fuel quality requirements		
8/06-10/06	Collapse in profit margins for oil refineries		

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Gasoline, unleaded regular	4/99	Anticipated cutback of crude oil production by OPEC and other countries	3/00, 8/00, 5/01, 6/01, 9/01
	6/99-9/99	Realized effects of a decrease in supply of crude oil by OPEC and other countries	
	6/00	Effects of implementing a new EPA requirement for reformulated gasoline	
	10/01-12/01	Return to a normal balance of expected supply and demand following a period of speculative supply	
	2/02-4/02	Effect of a significant decrease in imported crude and refined oil	
	12/02-3/03	Anticipation of Iraq war combined with effects of an oil strike in Venezuela	
	3/03-5/03	Oil strike in Venezuela ends, with faster than expected increases in oil supply	
	7/03-9/03	All time record demand for auto fuel, complicated by supply problems due to electrical blackouts at refineries in the Northeast and Midwest during late summer	
	9/03-11/03	Recovering domestic inventories following record high summer demand and refinery problems in the Northeast and Midwest	
	12/03-3/04	Extremely low inventories from refineries plus switch to production of summer blends to meet EPA regulations	
	5/04	Extra cost to refiners due to new environmental regulations, summer gasoline shortage, and continued tension in the Middle East.	
	10/04	Hurricane Ivan disruption effects on refineries in the Gulf of Mexico	
	1/05-4/05	Combined effects of robust global crude oil demand and increasing political uncertainty in Iraq, Venezuela and Nigeria	
	6/05-9/05	Damage to U.S. oil refineries resulting from Hurricane Katrina, along with record global petroleum demand and continued political unrest in Iraq, Venezuela and Nigeria	
	10/05-11/05	Recovery of domestic oil refineries the Gulf of Mexico, combined with easing crude oil prices	
3/06-5/06	World oil market conditions, growth in US demand, and ongoing implementation of domestic fuel quality requirements		
8/06-10/06	Collapse in profit margins for oil refineries		

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Ice cream and related products	5/01-7/01	Early year drop in milk production was slow to recover. Demand for dairy products remained strong.	11/03, 6/05
	3/03-6/03	Sluggish demand for dairy food “treats”	
Jewelry	3/06-5/06	Response to rising wholesale gold prices	None
Jewelry and watches	3/06-5/06	Response to rising wholesale gold prices	None
Juices and non-alcoholic drinks	4/02-6/02	Promotions associated with significant new brand introductions	10/00, 8/01, 7/03, 11/03
	9/02	Return to normal level of promotions for carbonated drinks	
	2/05-4/05	Orange juice futures increased due to cuts in projected citrus production of Florida, related to the previous hurricane season	

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Motor fuel	4/99	Anticipated cutback of crude oil production by OPEC and other countries	3/00, 8/00, 5/01, 6/01, 9/01
	6/99-9/99	Realized effects of a decrease in supply of crude oil by OPEC and other countries	
	6/00	Effects of implementing a new EPA requirement for reformulated gasoline	
	10/01-12/01	Return to a normal balance of expected supply and demand following a period of speculative supply	
	2/02-4/02	Effect of a significant decrease in imported crude and refined oil	
	12/02-3/03	Anticipation of Iraq war combined with effects of an oil strike in Venezuela	
	3/03-5/03	Oil strike in Venezuela ends, with faster than expected increases in oil supply	
	7/03-9/03	All time record demand for auto fuel, complicated by supply problems due to electrical blackouts at refineries in the Northeast and Midwest during late summer	
	9/03-11/03	Recovering domestic inventories following record high summer demand and refinery problems in the Northeast and Midwest	
	12/03-3/04	Extremely low inventories from refineries plus switch to production of summer blends to meet EPA regulations	
	5/04	Extra cost to refiners due to new environmental regulations, summer gasoline shortage, and continued tension in the Middle East.	
	10/04	Hurricane Ivan disruption effects on refineries in the Gulf of Mexico	
	1/05-4/05	Combined effects of robust global crude oil demand and increasing political uncertainty in Iraq, Venezuela and Nigeria	
	6/05-9/05	Damage to U.S. oil refineries resulting from Hurricane Katrina, along with record global petroleum demand and continued political unrest in Iraq, Venezuela and Nigeria	
	10/05-11/05	Recovery of domestic oil refineries the Gulf of Mexico, combined with easing crude oil prices	
3/06-5/06	World oil market conditions, growth in US demand, and ongoing implementation of domestic fuel quality requirements		
8/06-10/06	Collapse in profit margins for oil refineries		

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Moving, storage, freight expense	1/03	Increased fuel surcharges for moving	None
	9/04	Increased promotions offered as a result of lower occupancy of self-storage units	
	11/04	Return from promotional pricing	
	5/05	Return from promotional pricing	
	10/06	Increased promotions	
New cars	6/04-8/04	Effect of very large cash incentives offered by domestic automakers	11/01, 12/01, 1/02, 1/03, 2/03, 8/03
	11/04	Return to normal promotions, combined with the effect of a model changeover	
	6/05-8/05	Employee pricing discounts offered by domestic automakers and corresponding incentives offered by imported makes	
	8/05-10/05	Short supply of fuel-efficient vehicles in light of record gasoline prices, combined with early 2006 model changeovers and a return to normal promotions following employee pricing offers	
New cars and trucks	6/04-8/04	Effect of very large cash incentives offered by domestic automakers	1/00, 2/00, 11/01, 12/01, 1/02, 1/03, 2/03, 8/03
	11/04	Return to normal promotions, combined with the effect of a model changeover	
	6/05-8/05	Employee pricing discounts offered by domestic automakers and corresponding incentives offered by imported makes	
	8/05-10/05	Short supply of fuel-efficient vehicles in light of record gasoline prices, combined with early 2006 model changeovers and a return to normal promotions following employee pricing offers	
New trucks	6/04-8/04	Effect of very large cash incentives offered by domestic automakers	1/00, 2/00, 10/01, 11/01, 12/01, 1/02, 1/03, 2/03, 11/06
	11/04	Return to normal promotions, combined with the effect of a model changeover	
	6/05-8/05	Employee pricing discounts offered by domestic automakers and corresponding incentives offered by imported makes	
New vehicles	6/04-8/04	Effect of very large cash incentives offered by domestic automakers	1/00, 2/00, 11/01 12/01, 1/02, 1/03, 2/03, 8/03
	11/04	Return to normal promotions, combined with the effect of a model changeover	
	6/05-8/05	Employee pricing discounts offered by domestic automakers and corresponding incentives offered by imported makes	
	8/05-10/05	Short supply of fuel-efficient vehicles in light of record gasoline prices, combined with early 2006 model changeovers and a return to normal promotions following employee pricing offers	

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Nonalcoholic beverages and beverage materials	4/02-6/02	Promotions associated with significant new brand introductions in carbonated drinks	10/00, 8/01, 7/03, 11/03
	9/02	Return to normal level of promotions for carbonated drinks	
	2/05-4/05	Orange juice futures increased due to cuts in projected citrus production of Florida, related to the previous hurricane season, combined with a small Brazilian coffee crop	
Nondurables less food and apparel	4/99	Anticipated cutback of crude oil production by OPEC and other countries	3/00, 8/00, 5/01, 6/01, 9/01
	6/99-9/99	Realized effects of a decrease in supply of crude oil by OPEC and other countries	
	6/00	Effects of implementing a new EPA requirement for reformulated gasoline	
	10/01-12/01	Return to a normal balance of expected motor fuel supply and demand following a period of speculative supply	
	2/02-4/02	Effect of a significant decrease in imported crude and refined oil	
	12/02-3/03	Anticipation of Iraq war combined with effects of an oil strike in Venezuela	
	3/03-5/03	Oil strike in Venezuela ends, with faster than expected increases in oil supply	
	7/03-9/03	All time record demand for auto fuel, complicated by supply problems due to electrical blackouts at refineries in the Northeast and Midwest during late summer	
	9/03-11/03	Recovering domestic inventories following record high summer demand and refinery problems in the Northeast and Midwest	
	12/03-3/04	Extremely low inventories from refineries plus switch to production of summer blends to meet EPA regulations	
	5/04	Extra cost to refiners due to new environmental regulations, summer gasoline shortage, and continued tension in the Middle East.	
	10/04	Hurricane Ivan disruption effects on refineries in the Gulf of Mexico	
	1/05-4/05	Combined effects of robust global crude oil demand and increasing political uncertainty in Iraq, Venezuela and Nigeria	
	6/05-9/05	Damage to U.S. oil refineries resulting from Hurricane Katrina, along with record global petroleum demand and continued political unrest in Iraq, Venezuela and Nigeria	
	10/05-11/05	Recovery of domestic oil refineries the Gulf of Mexico, combined with easing crude oil prices	
3/06-5/06	World oil market conditions, growth in US demand, and ongoing implementation of domestic fuel quality requirements		
8/06-10/06	Collapse in profit margins for oil refineries		

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Nondurables less food, beverages, and apparel	4/99	Anticipated cutback of crude oil production by OPEC and other countries	3/00, 8/00, 5/01, 6/01, 9/01
	6/99-9/99	Realized effects of a decrease in supply of crude oil by OPEC and other countries	
	6/00	Effects of implementing a new EPA requirement for reformulated gasoline	
	10/01-12/01	Return to a normal balance of expected motor fuel supply and demand following a period of speculative supply	
	2/02-4/02	Effect of a significant decrease in imported crude and refined oil	
	12/02-3/03	Anticipation of Iraq war combined with effects of an oil strike in Venezuela	
	3/03-5/03	Oil strike in Venezuela ends, with faster than expected increases in oil supply	
	7/03-9/03	All time record demand for auto fuel, complicated by supply problems due to electrical blackouts at refineries in the Northeast and Midwest during late summer	
	9/03-11/03	Recovering domestic inventories following record high summer demand and refinery problems in the Northeast and Midwest	
	12/03-3/04	Extremely low inventories from refineries plus switch to production of summer blends to meet EPA regulations	
	5/04	Extra cost to refiners due to new environmental regulations, summer gasoline shortage, and continued tension in the Middle East.	
	10/04	Hurricane Ivan disruption effects on refineries in the Gulf of Mexico	
	1/05-4/05	Combined effects of robust global crude oil demand and increasing political uncertainty in Iraq, Venezuela and Nigeria	
	6/05-9/05	Damage to U.S. oil refineries resulting from Hurricane Katrina, along with record global petroleum demand and continued political unrest in Iraq, Venezuela and Nigeria	
	10/05-11/05	Recovery of domestic oil refineries the Gulf of Mexico, combined with easing crude oil prices	
3/06-5/06	World oil market conditions, growth in US demand, and ongoing implementation of domestic fuel quality requirements		
8/06-10/06	Collapse in profit margins for oil refineries		

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Other household fuels	12/00-1/01	High refill rates among consumers and good economy	2/00, 3/00, 8/04
	1/01-4/01	Positive storage and inventory build-up because of warmer weather trends and slowing economy	
	1/03-3/03	Intense winter weather and increasing demand	
	3/03-5/03	End of intense winter and declining demand	
	12/03-2/04	Above average fuel demand due to colder than expected winter	
	9/04-11/04	Supply disruptions due to Hurricane Ivan	
	8/05-10/05	Supply disruptions due to Hurricane Katrina	
	8/06-10/06	Supply outpaced demand due to storage buildup from unseasonably mild weather	
Other poultry including turkey	11/01	Large production increase in October due to increased turkey slaughter and heavier overall bird weights	7/00, 2/01, 12/02, 7/03
	9/02	Marketing response to clear surplus stock heading into the holiday season	
Other processed fruits and vegetables including dried	12/01-6/02	Supply difficulties related to short crops in apples and California naval oranges	None
	11/04-4/05	Hurricane damage to harvests in Florida	
Other sweets	None	Not applicable	4/00, 4/02, 8/03, 4/05, 6/05, 5/06

CPI series – intervention analysis seasonal adjustment-continued

Series	Level shift period(s)	Event	Outliers
Pork	1/00-3/00	Response to low pork production	4/05
Tomatoes	9/04-11/04	Damage to tomato crops caused by hurricanes	5/05
	12/04-1/05	Recovery of tomato crops	
	11/05-1/06	Damage to Florida tomato crop caused by Hurricane Wilma	
	1/06-3/06	Recovery of supplies from damage caused by Hurricane Wilma	
	8/06-10/06	Hotter than normal temperatures in California reduced tomato supplies	
	10/06-12/06	Recovery of supplies from damage caused by hotter than normal temperatures in California	
Utility (piped) gas service	5/00-7/00	High demand due to economic growth plus increased gas use for electricity	10/06
	8/00-10/00	High demand due to economic growth plus increased gas use for electricity	
	11/00-1/01	Low inventories for the expected demand of the winter heating season	
	5/01-10/01	Continued adequate gas supplies, warmer than expected weather, and slowing economy	
	1/03-3/03	Supply problems in Venezuela, onset of colder than expected weather, and historically low storage levels	
	10/04-11/04	Supply disruptions due to Hurricane Ivan	
	8/05-10/05	Supply disruptions due to Hurricane Katrina	
	1/06-6/06	Historically warm weather and recovery from Hurricane Katrina	