

Energy Market Power Mitigation

Energy & Ancillary Services Workgroup

Meeting 4

June 13, 2018

- Summary of CMD3 proposal
- Updated elements of the proposal
 - Timing
 - Definition of obligation
 - Residual supplier index threshold
 - No-look scarcity test threshold
 - Asset-specific reference prices
 - Further study
- Data appendix
 - RSI and mark-ups
 - Duration curves and obligations

Energy market mitigation context

- Implementation of a capacity market will provide an additional revenue stream to participants
- Energy market provides critically-important operational and investment signals to market participants
 - Short-term production / cycling and consumption decisions
 - Operating costs should be recoverable from the energy market
- Maintain the real-time price as a signal of energy scarcity
 - High prices provide important incentives to all participants when energy is scarce; this is not market power
- Incentive for market participants to make use of and benefit from engaging in forward market transactions to hedge price risk
 - Forward commitments meaningfully impact the incentive to exercise market power

- The AESO will conduct an hourly ex ante test of market power
- A Pivotal Supplier Test (PST) will be evaluated based on a Residual Supplier Index (RSI)
 - Ex ante approach limits markups that would occur due to market power and not market fundamentals
- RSI is a metric to monitor market power. If a firm is identified by the RSI test, this does not imply suppliers are exercising market power, however it will limit markups.
- The asset specific mitigation level is based on some multiple of SRMC or opportunity cost recognizing operating costs greater than SRMC during the year (single part bid framework)
- Ongoing ex post mitigation or assessment of RSI efficacy will be applied where cleared offer data is used to assess whether offers were in fact competitive

Energy market power mitigation test:

Three elements



The market power mitigation test is a three-part test of offer prices. It is applied separately in each delivery hour:

1. No-look scarcity test: If the market is very tight in a delivery hour, there will be no market power mitigation in that delivery hour irrespective of generator concentration or offer prices.
2. Market power screen: Determine whether the firms that control energy offers have structural market power (recognizing obligations).
3. Asset-specific reference price (ASRP): Calculate the maximum price level that a generator would be expected to offer energy at if it had no market power.

Energy market power mitigation test:

Conditions in which an offer is to be mitigated

- An offer price fails the market power mitigation test if the following three conditions are satisfied:
 - If the energy market is not tight &
 - A specific firm has market power (recognizing obligations) &
 - Has submitted offer prices it controls is above the relevant ASRP
- If an offer price fails the market power mitigation test, it will automatically be restated to the ASRP

- The AESO anticipates turning T-2 to black in the final CMD
- This reflects the AESO's decision that the mitigation framework will be implemented after offer price restatements are no longer accepted
- Information published by the AESO will support market participants' forming expectations about
 - whether mitigation is likely in a given delivery hour (the no-look scarcity test), as well as elements of the RSI formula
 - Incentives to self mitigate or submit voluntary obligations
- Ex ante approach ensures the system marginal price reflects the prevailing price without market power

Definition of obligation in RSI formula

- The AESO anticipates including financial obligations in the definition of acceptable obligations
- Some market participants suggested that the AESO investigate whether, on a firm-by-firm basis in a given delivery hour, the sum of offers made to the energy market at prices below a measure of cost can be used as a proxy for the physical and financial obligation term
 - The AESO is considering such a proposal but believes it inadequately mitigates market power
 - The proxy may be insufficient as a firm maintains exposure to the spot price and therefore retains the incentive to include markups

Definition of obligation in RSI formula

- Obligations remain voluntary, positive and only as required to net off potential pivotal position
- Creates right incentive for forward trading which mitigates the incentive to exercise market power
- The RSI identifies three types of firms: fully pivotal, marginally pivotal, and not pivotal.
 - Marginally pivotal firms will monitor how market changes impact their pivotal identification
 - May seek to offset volumes

Residual supplier index threshold: $RSI = 1.0$ ($RSI < 1.0$ identifies pivotal firms)

- The AESO anticipates that the residual supplier index of less than 1 will turn to black in the final CMD proposal
- Based on the analysis conducted, which includes accounting for obligations in the RSI formula, the AESO is satisfied that 1 is the appropriate threshold
 - Strikes a balance between mitigating egregious exercises of market power, providing incentives for firms to self-mitigate by entering into forward supply arrangements, and allowing market outcomes to be guided by competition
- AESO analysis was extended to include years 2013-2017
 - Shows substantial price mark-ups by the price-setting block if a firm has structural market power
 - See data appendix to this presentation

No-look scarcity test threshold: 500 MW

- The AESO is satisfied that a 500 MW threshold for the no-look scarcity test is the appropriate level of supply cushion at which mitigation should be lifted
 - Achieves appropriate energy market prices in the context of the energy market structure that exists in Alberta
 - See data appendix to this presentation
- The AESO is continuing to assess its approach to mitigation at higher levels of the supply cushion (graduated RSI); this is subject to change before the final CMD
- The AESO is investigating potential issues with the use of the metric that underlies the AESO's supply adequacy report as the metric for use in the no-look scarcity test

Asset-specific reference prices: Energy-limited assets and opportunity cost

- The AESO recognizes the importance of water management to the operation of hydro assets and that opportunity cost is a critical element of determining when the available water is best used to produce energy
- The AESO continues to be of the view that in periods when water is scarce and opportunity cost is relatively high it is appropriate for there to be no energy market mitigation for such an asset if that asset makes offers to provide ancillary services, especially active spinning and supplemental reserves and standby reserves
- The relevant products and volume obligations will be determined during the rule development phase that will follow publication of the final CMD

Asset-specific reference prices: Other changes and outstanding analysis

- Specificity regarding some elements of the formula
 - Carbon pricing explicitly accounts for output-based allocation
 - Natural gas price will be a daily index
- The AESO is currently investigating historical run-times with a view to informing the reasonability of scenarios relevant to setting asset-specific reference prices
 - This analysis was used to support setting the asset-specific reference price at 3 times short-run marginal cost (SRMC)
 - Simplicity with a single metric for an upper bound

Data appendix

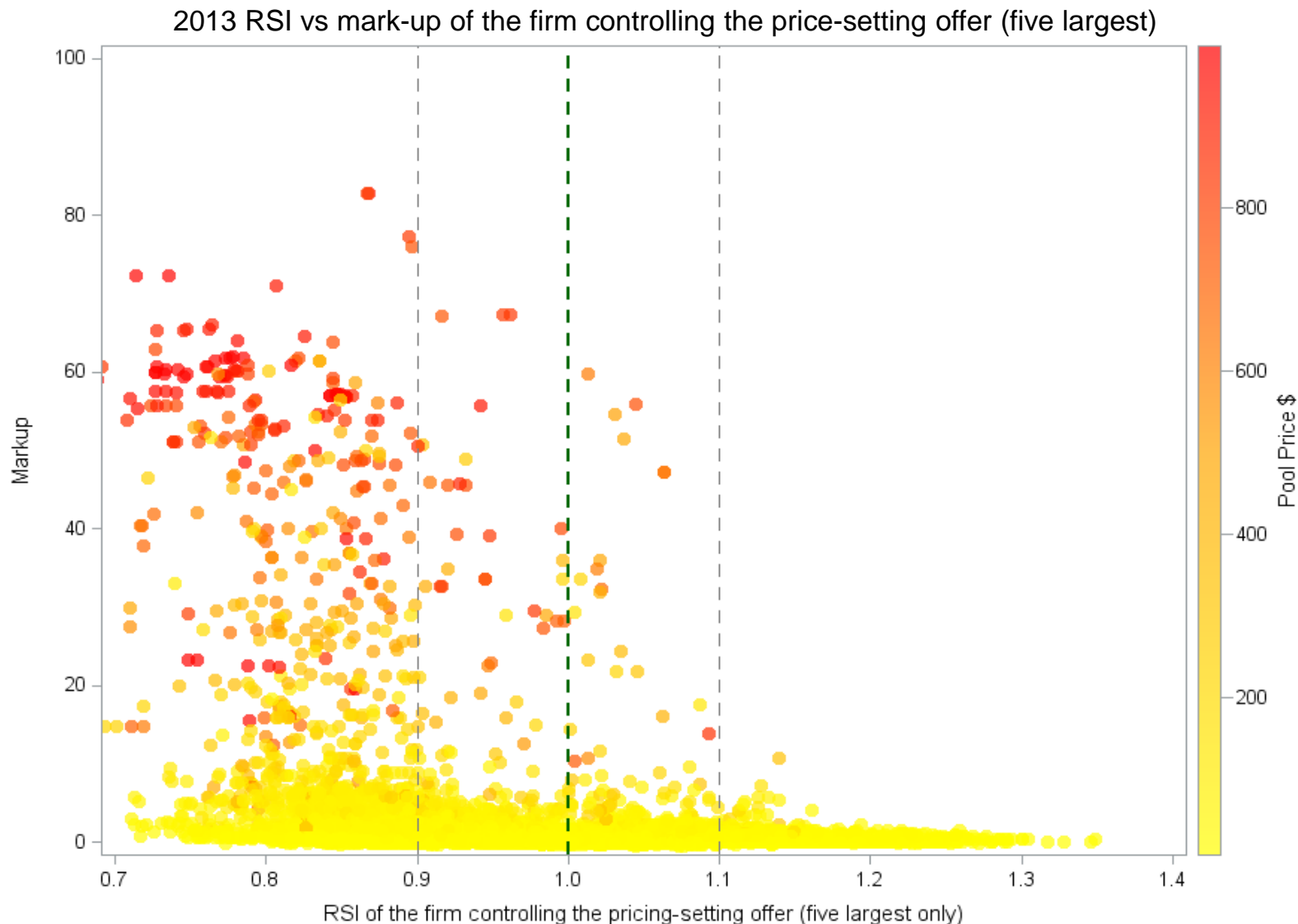
Market power screen: Threshold for the residual supplier index

The AESO is satisfied that firms with market power are appropriately identified with $RSI = 1.0$ test

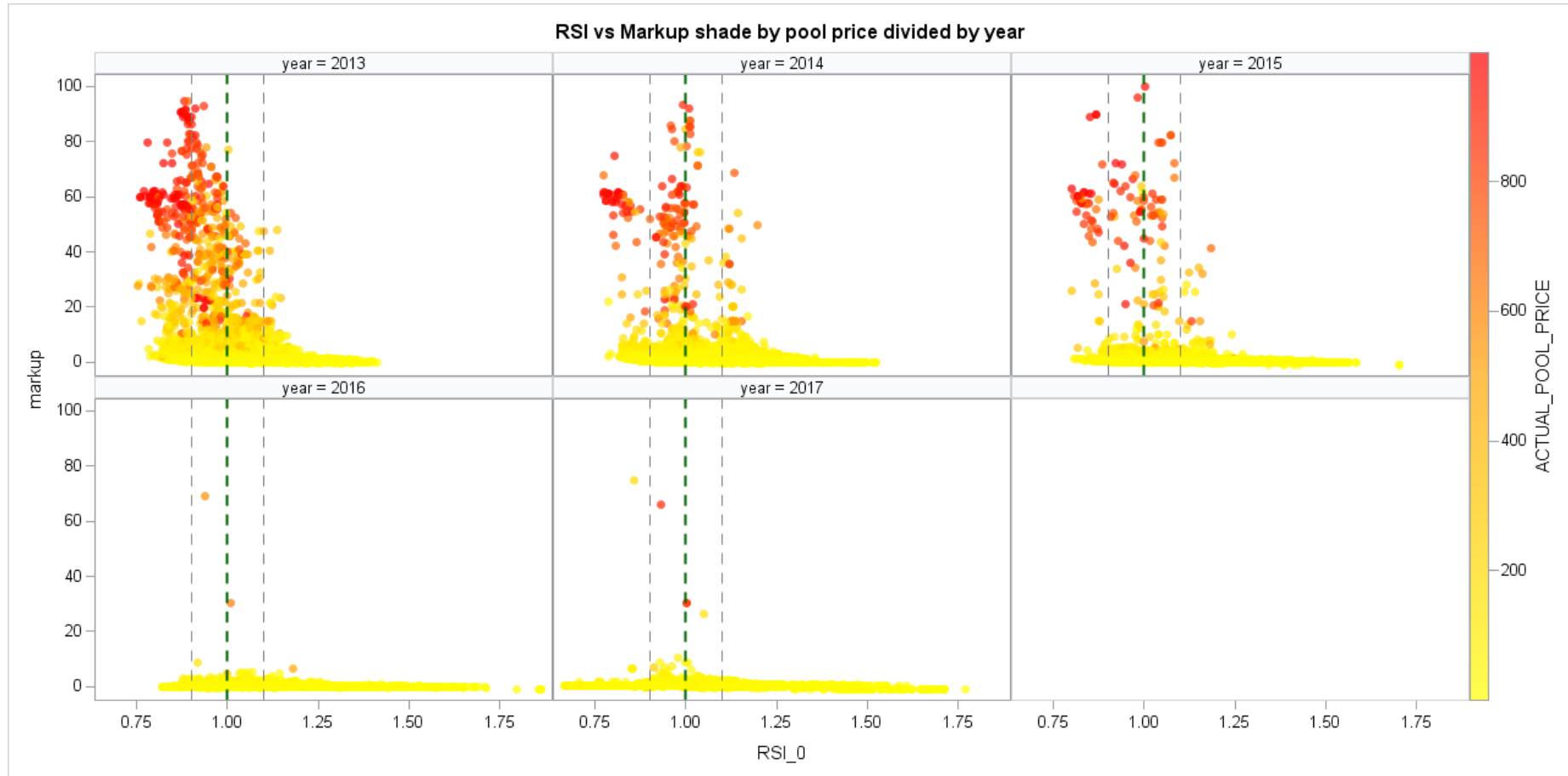


- At the April 5 EAS workgroup meeting, the AESO discussed the relationship between the RSI (assuming no obligations) and the mark-up of the price-setting offer for the year 2013
 - Repeated on the next slide
- Market participants requested that the AESO provide similar analysis for other years
 - Analysis for 2013 to 2017 is presented two slides ahead
 - Note: the AESO refined its estimates of short-run marginal cost and so the estimates of mark-ups for 2013 are slightly different
- The AESO is satisfied that firms with market power are appropriately identified with $RSI=1$ test

April 5 EAS WG: Pivotal Supplier Test: Significant mark-ups at low values of RSI



Similar results in other tight supply-demand years (2014 and 2015) (change in estimate of SRMC)



2014 and 2015 are similar to 2013; 2016 and 2017 have very different offer behaviour

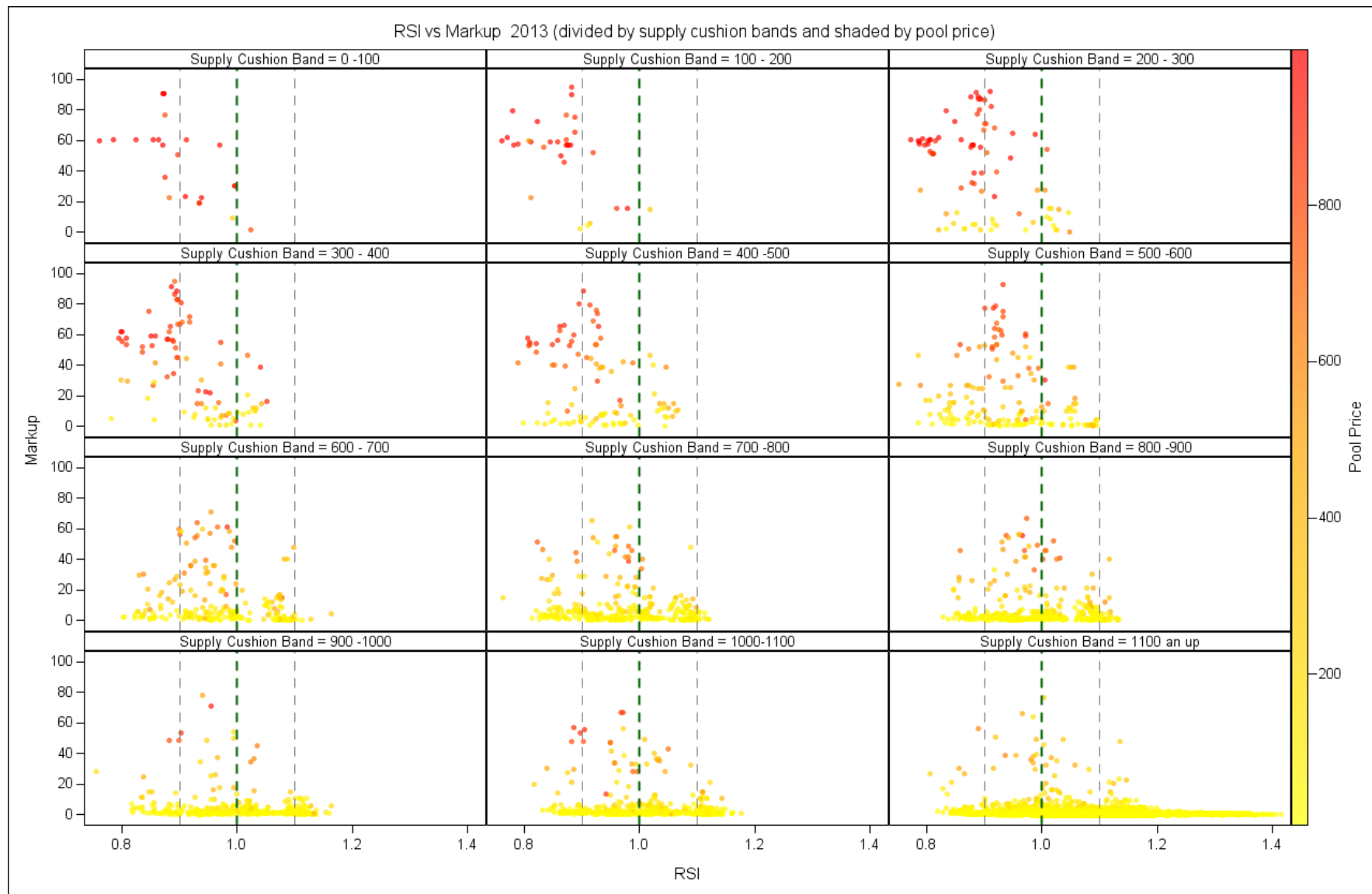
- Results for 2014 and 2015 are similar to 2013
 - The analysis demonstrates high mark-ups are common when the RSI is low
 - Capture hours most susceptible to exercises of market power
- The results for 2016 and 2017 reflect unusual offer behaviour and different market conditions that is unlikely to be carried forward
- Issue is how to choose the level of RSI at which to determine that offers should be considered for mitigation
 - Setting the RSI threshold at 1 achieves this objective
- Allows market-based competition in most hours by focusing on the key hours when the structural ability to exercise market power is greatest

High pool prices at low values of RSI

- To explore this further, the following figures organize the RSI compared to mark-up data by supply cushion bin
 - For the years 2013 to 2015, a low supply cushion was generally an indicator of both a relatively high pool price and RSIs being relatively low
 - In these years, there are many examples of supply cushions in excess of 500 MW that have very high mark-ups and pool prices; these are the hours that are most likely to see some mitigation of offer prices
 - 2016 and 2017 were generally different due to unique offer behaviour circumstances
 - Further analysis pending on tightest hours.
 - Likely risk of false positives > risk that market wont price efficiently

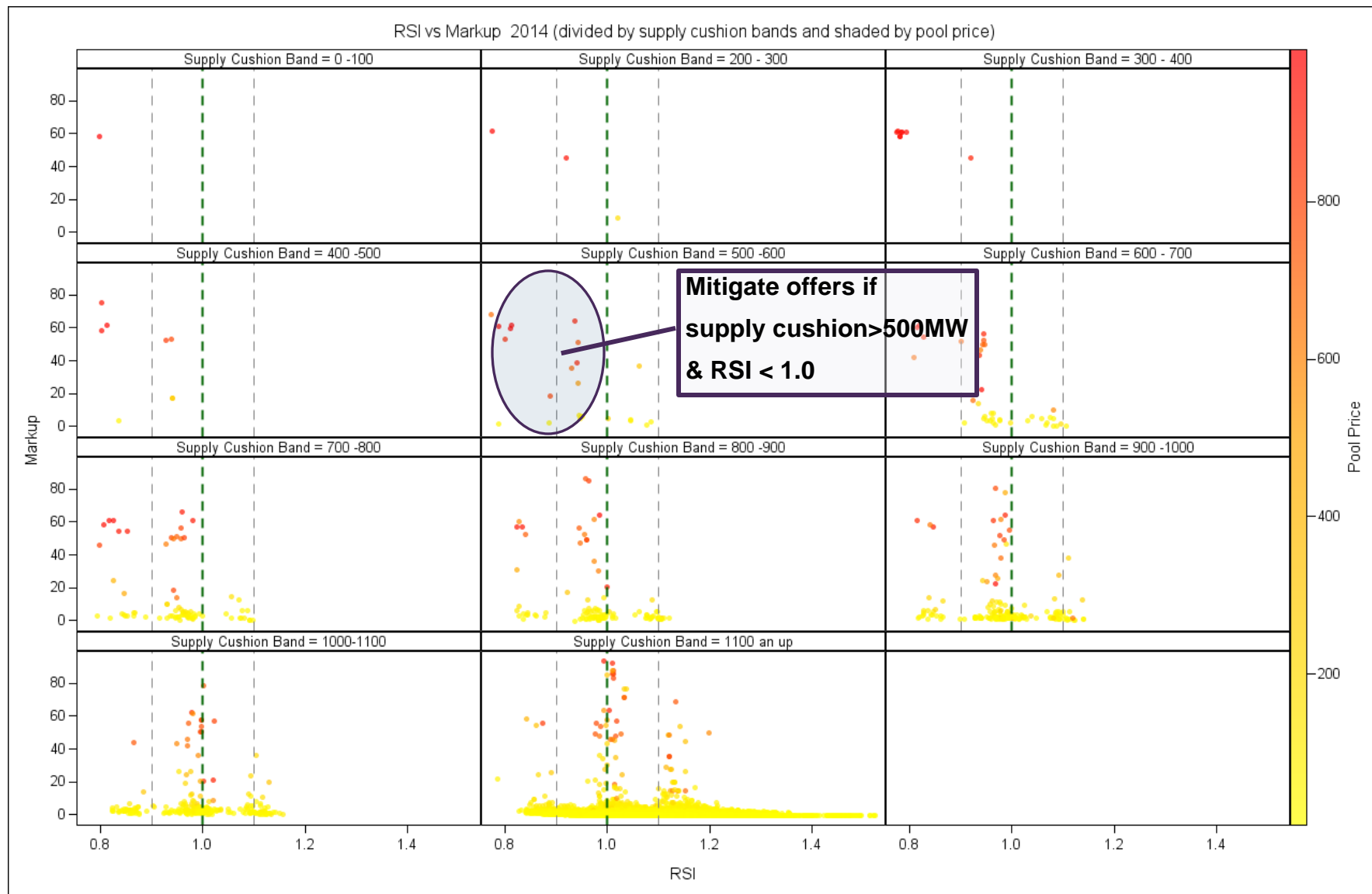
Supply Cushion Band Shaded by Pool Price

2013 RSI vs Markup



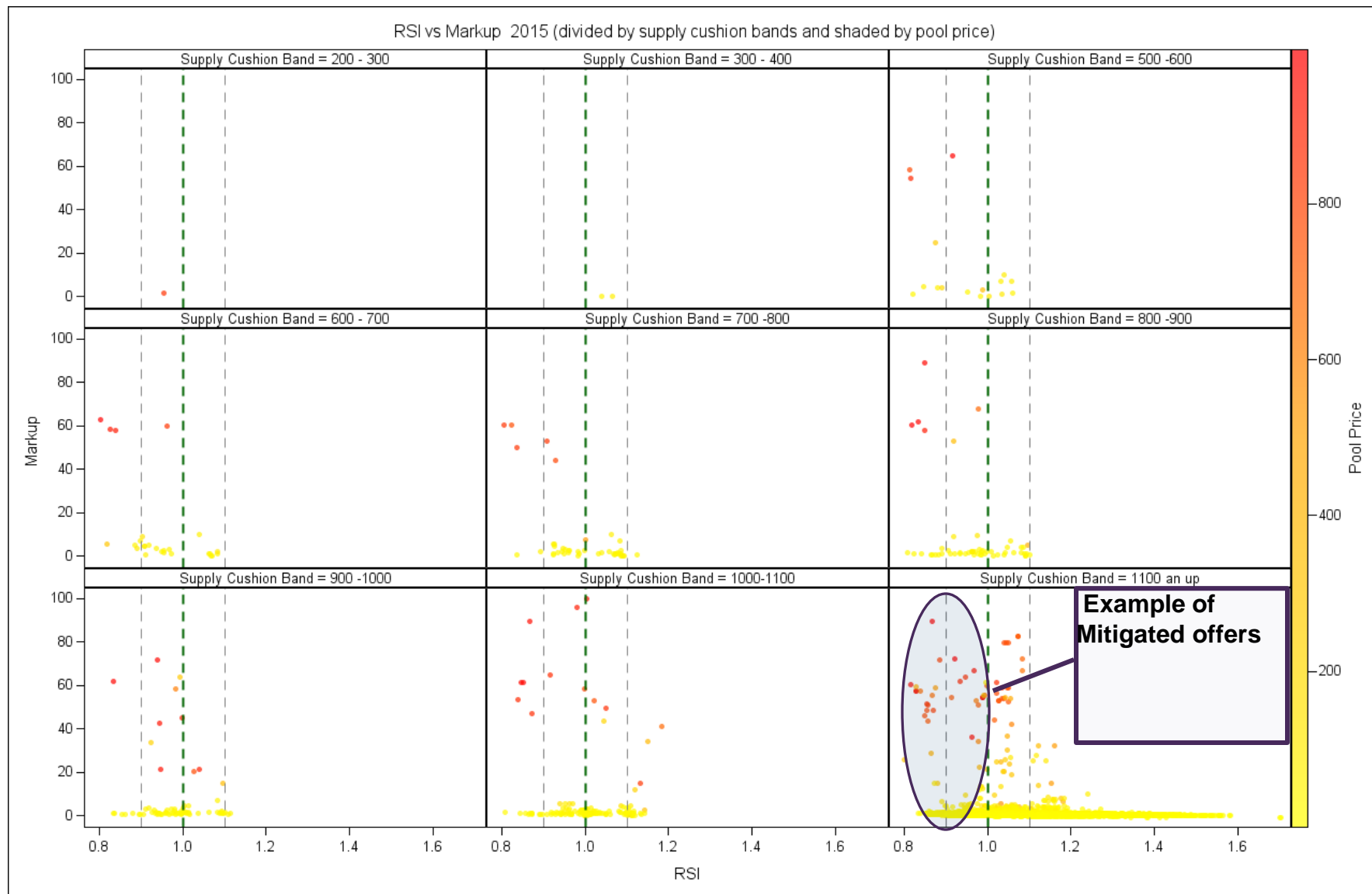
Supply Cushion Band Shaded by Pool Price

2014 RSI vs Markup



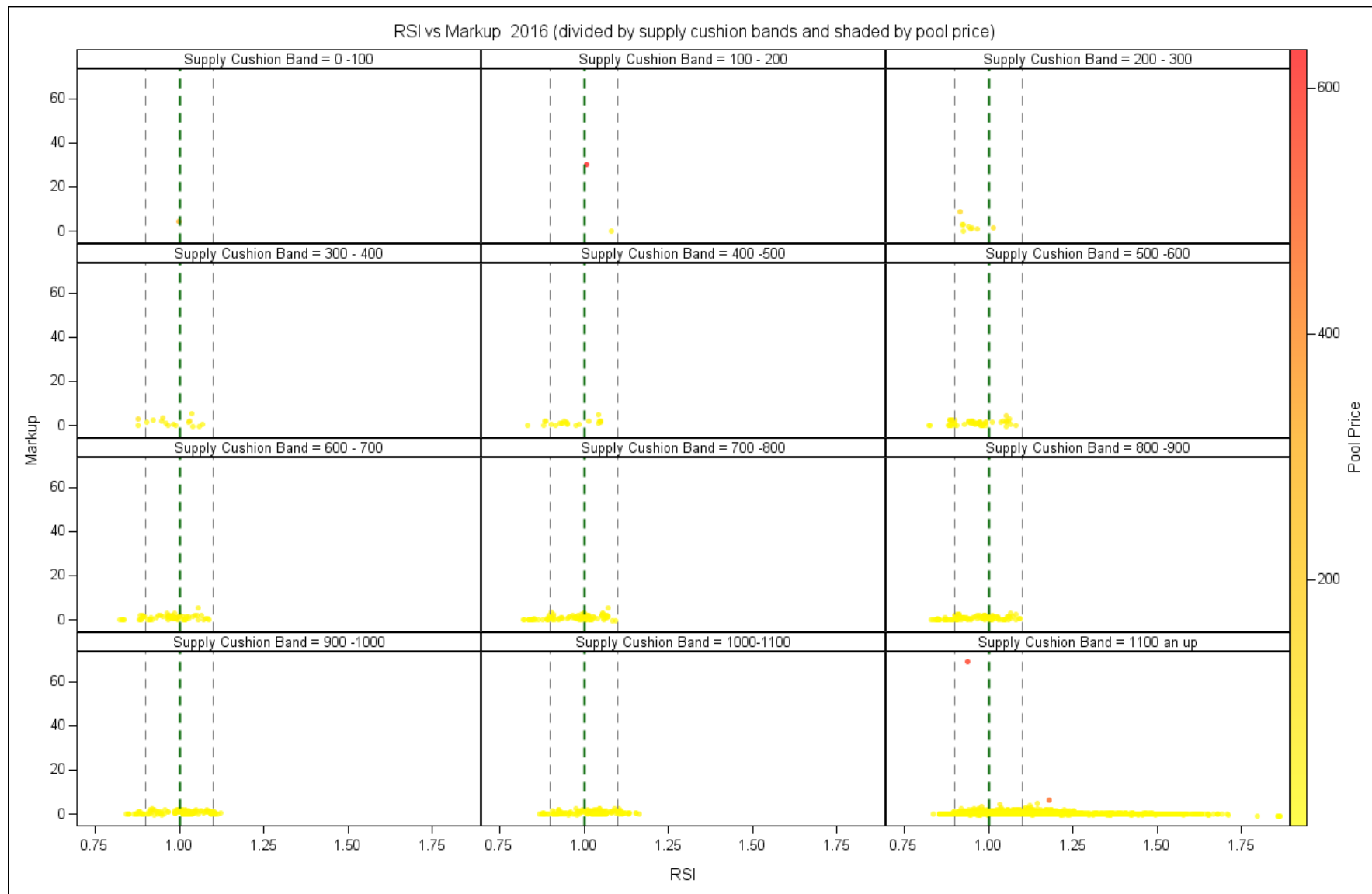
Supply Cushion Band Shaded by Pool Price

2015 RSI vs Markup



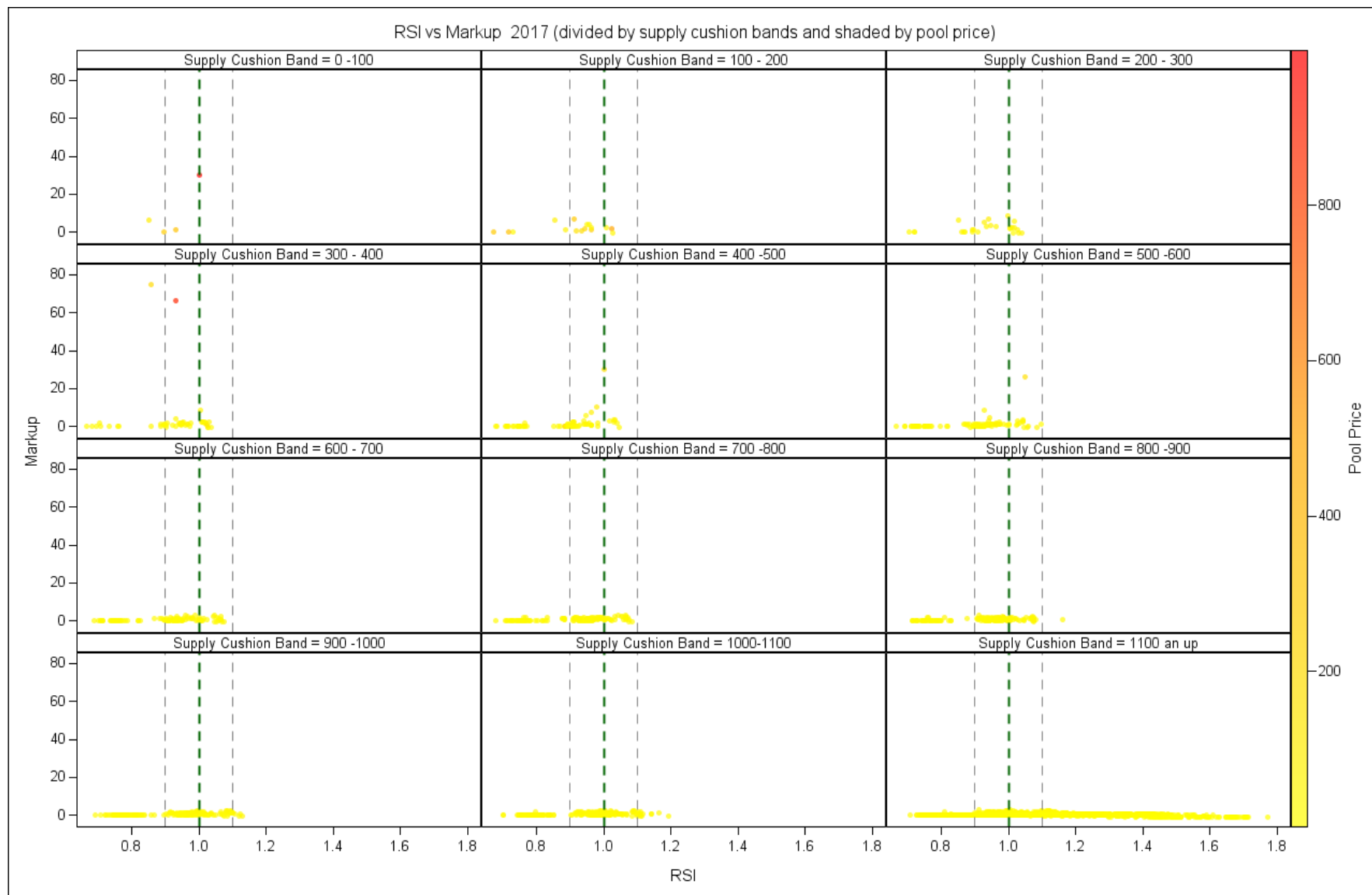
Supply Cushion Band Shaded by Pool Price

2016 RSI vs Markup



Supply Cushion Band Shaded by Pool Price

2017 RSI vs Markup

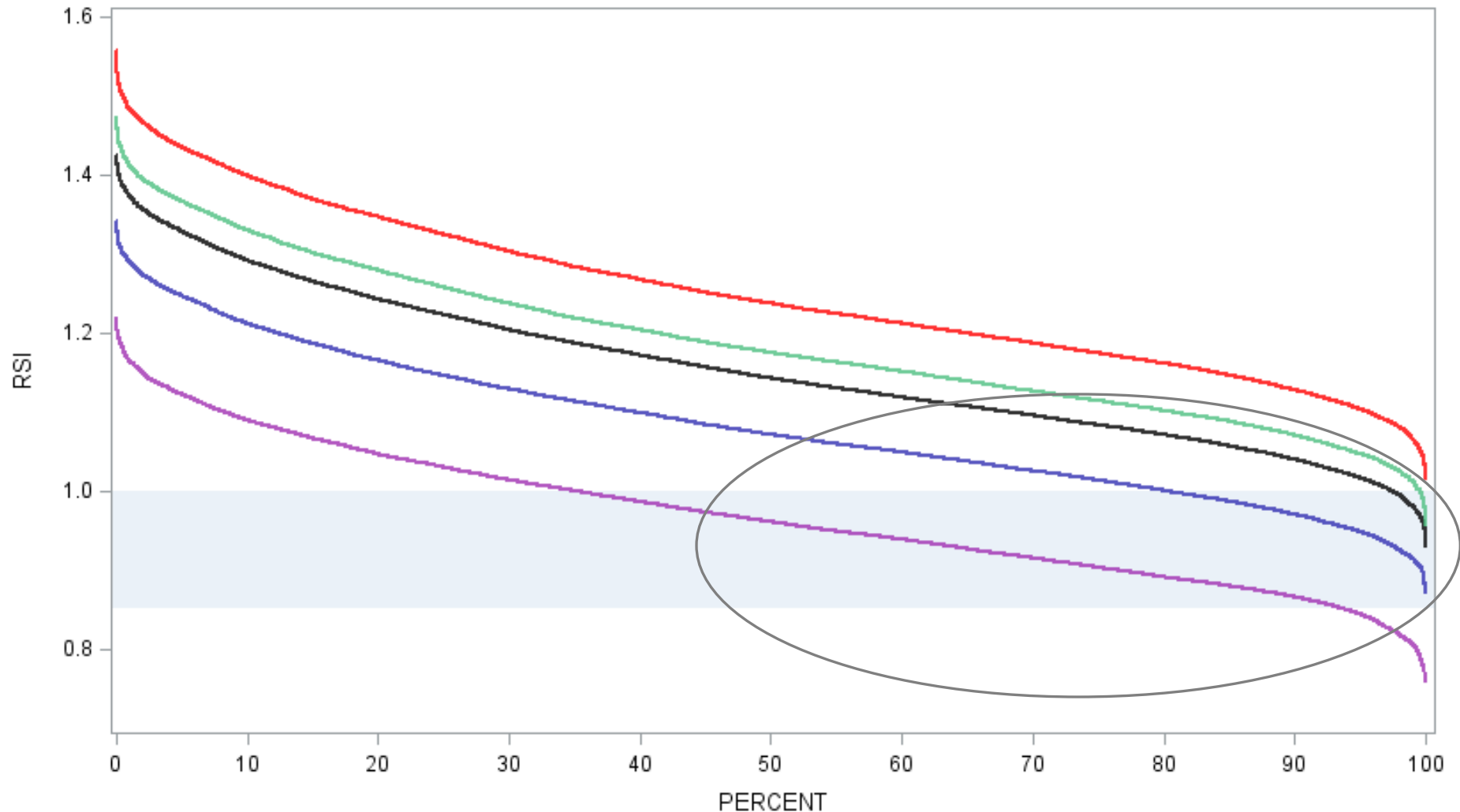


RSI duration curves

April 5 EAS WG: Pivotal Supplier Test: Larger firms fail the test more often

- At the April 5 EAS workgroup meeting, the AESO discussed the following figure that reports the RSI for each of the five largest firms
 - All hours of forecast year 2021: demand from AESO LTO (2017); offer control from MSA Market Share Offer Control Report (2017) with PPAs ignored; 1,200 MW of wind added
 - The shaded band is RSI from 0.85 to 1.0
- The AESO is satisfied that firms with market power are appropriately identified with RSI = 1.0 test
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- In the slides thereafter, the AESO reports 2013 to 2017 RSI duration curves

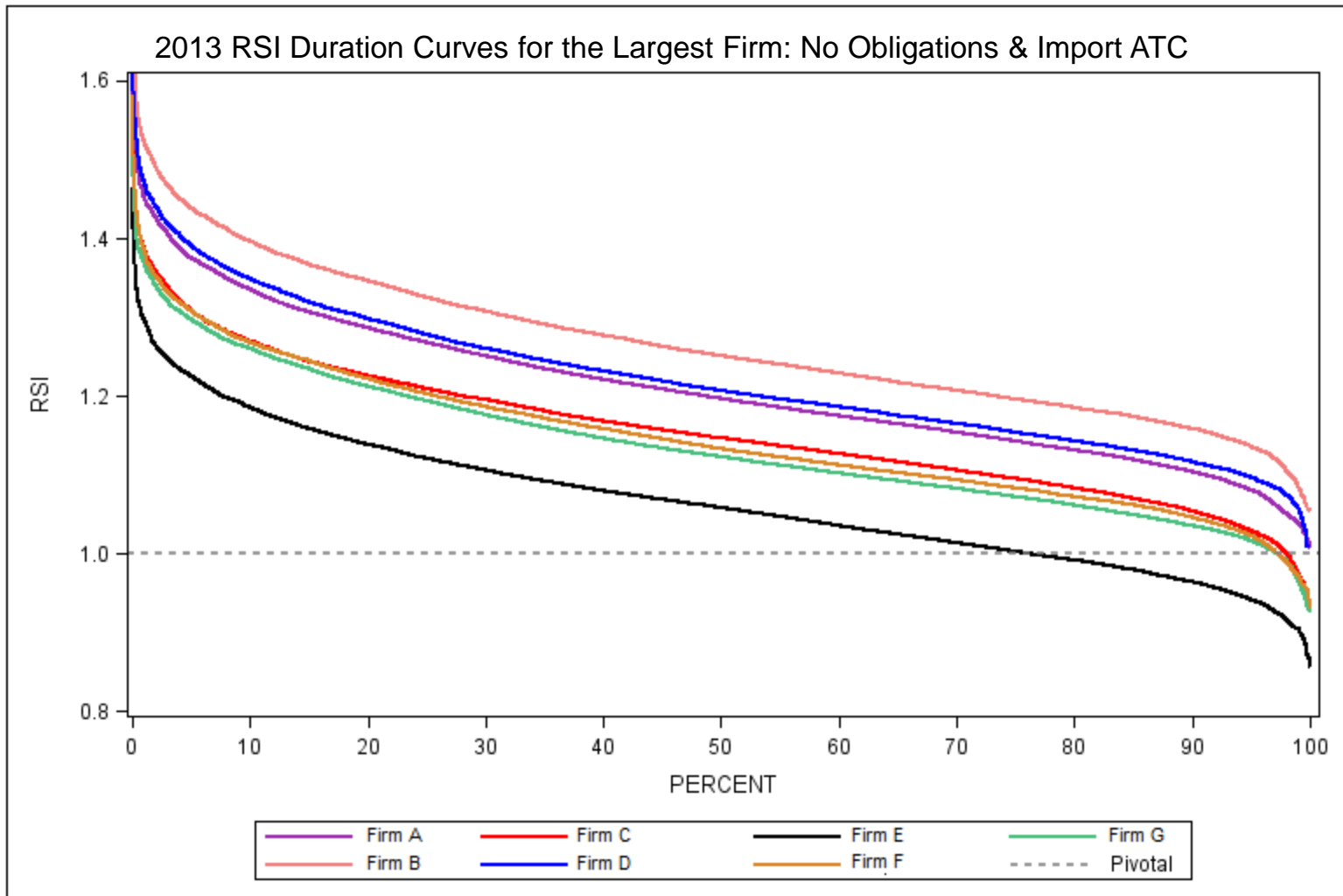
Pivotal Supplier Test: Larger firms would fail the test more often



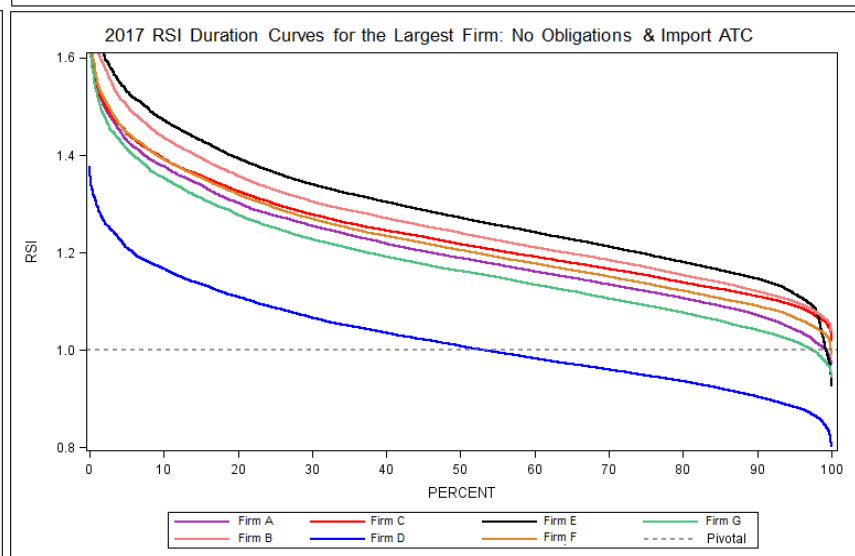
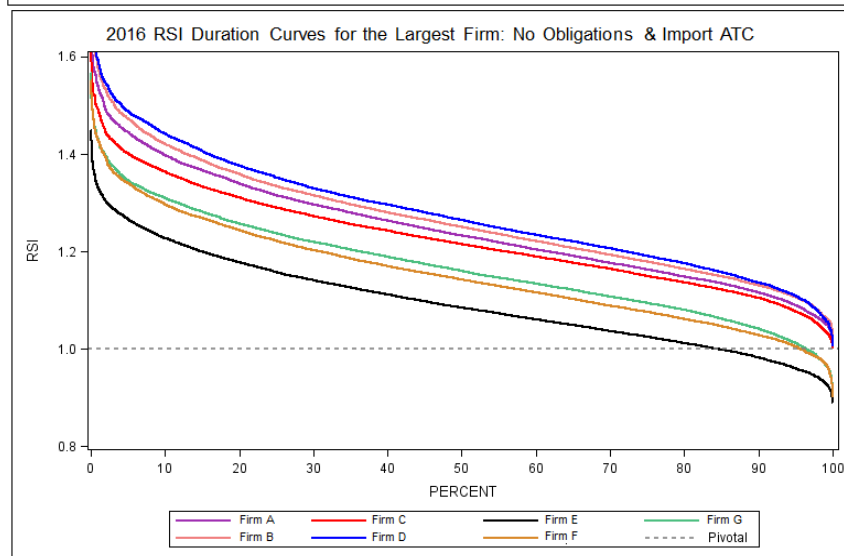
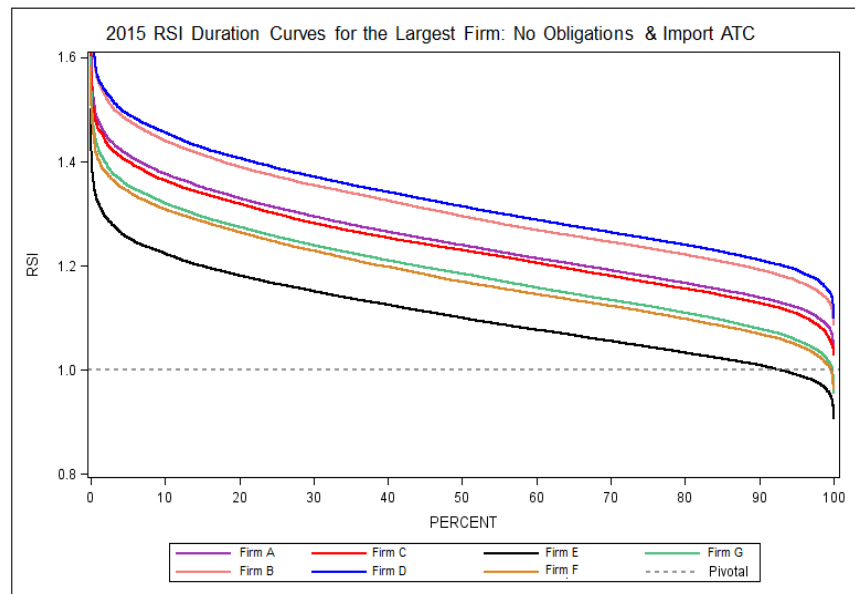
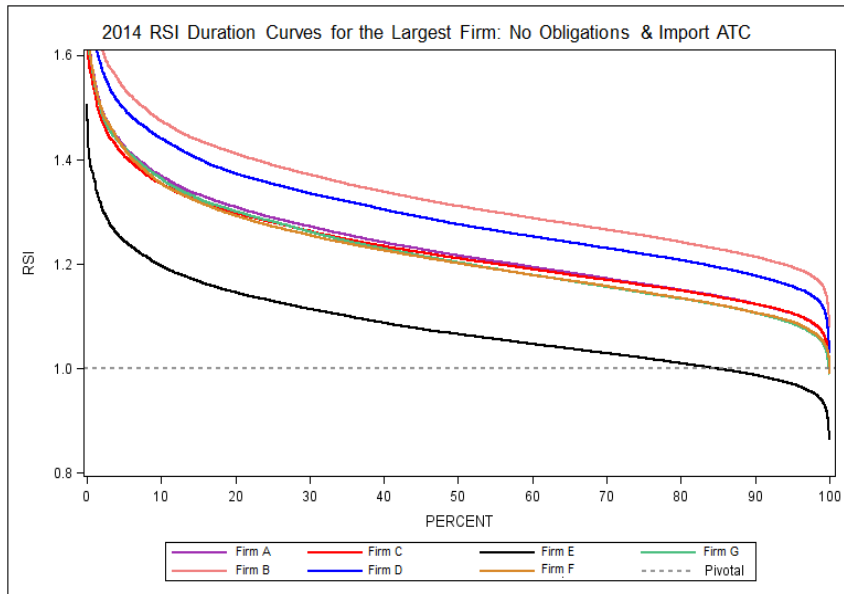
2013 to 2017 RSI duration curves: No obligation and import ATC

- The following figures illustrate the 2013 to 2017 RSI duration curves for the largest firms in the market in the relevant year assuming:
 - No obligations
 - Import ATC included (maximum annual value used in each hour; instead of only imports as scheduled)
- The adjustment of accounting for intertie from ATC to schedules as well as the recognition of obligations will impact the RSI results
- The AESO is satisfied that firms with market power are appropriately identified with $RSI = 1.0$ test

2013 RSI duration curves: No obligation and import ATC



2014-2017 No Obligation + Import ATC



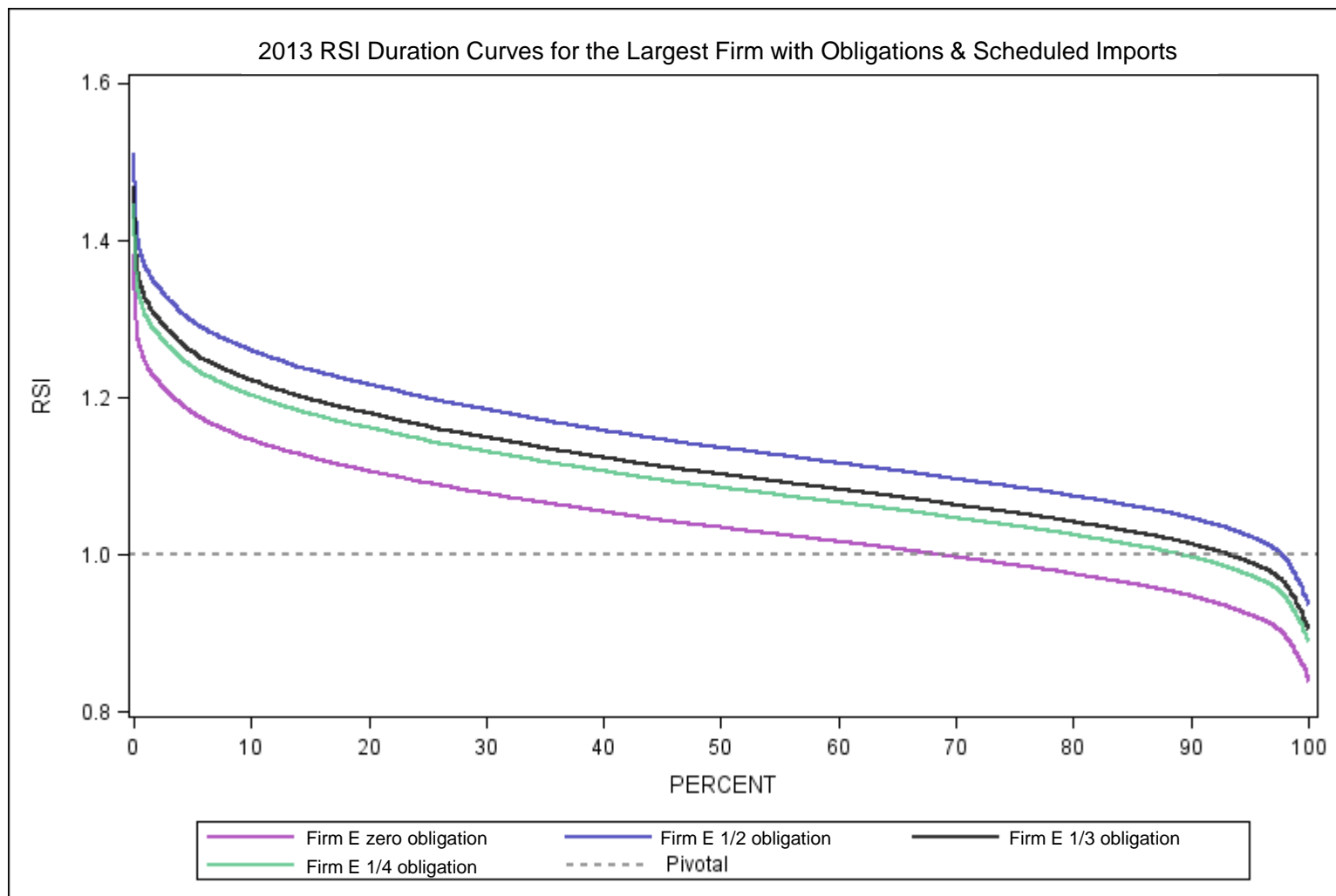
RSI duration curves: Impact of including obligations

2013 to 2017 RSI duration curves: With obligations and scheduled imports

- The following figures illustrate the 2013 to 2017 RSI duration curves for the largest firm in the market in the relevant year assuming:
 - Various levels of obligations
 - Scheduled imports only (excludes available but unutilized ATC)
- In all cases, the inclusion of obligations substantially reduces the fraction of time in which the largest firm is identified as pivotal
 - Even in a very tight year such as 2013, a moderate level of obligations results in a very small fraction of hours in which the largest firm is identified as pivotal
 - The smaller firms are less likely to be pivotal at any level of obligations

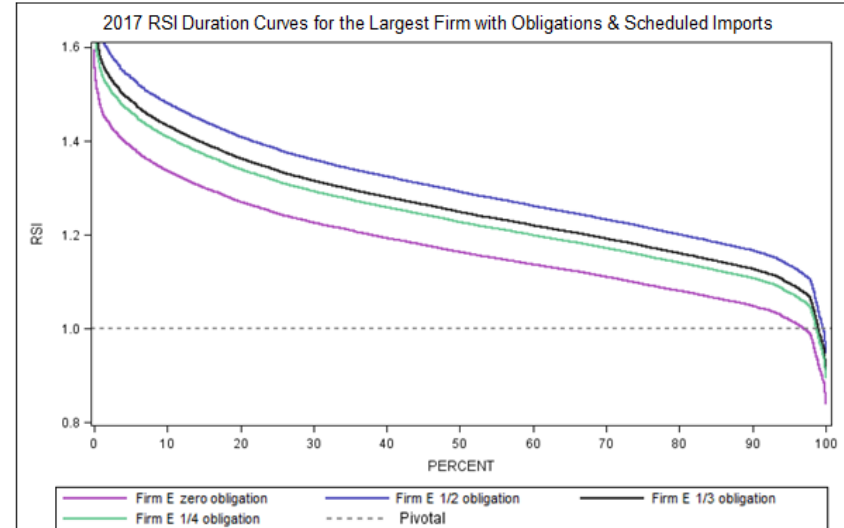
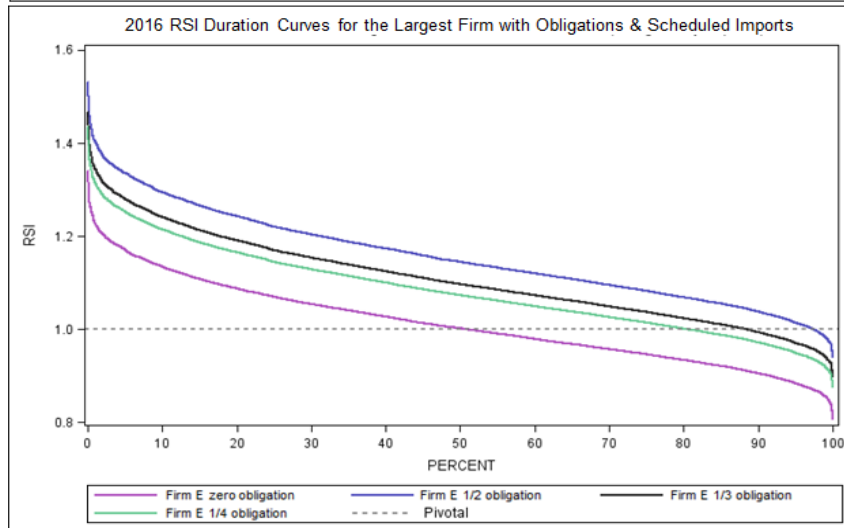
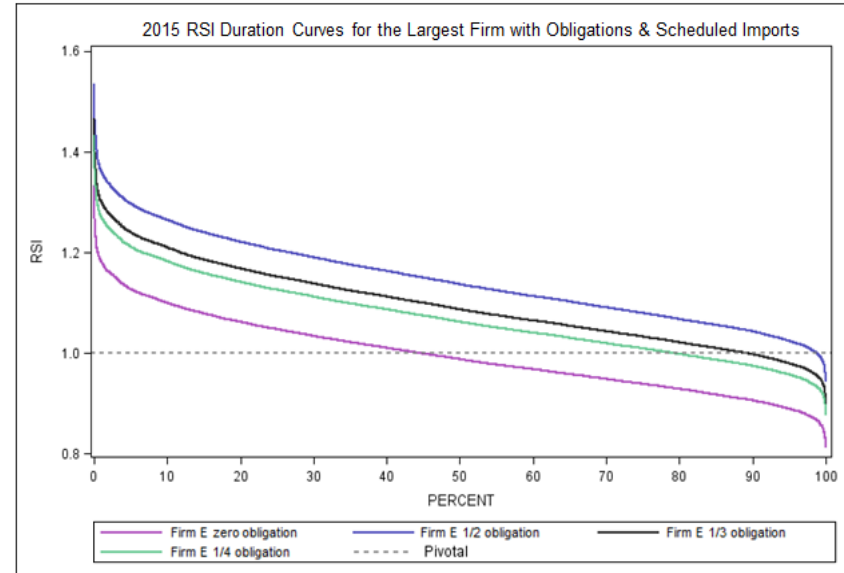
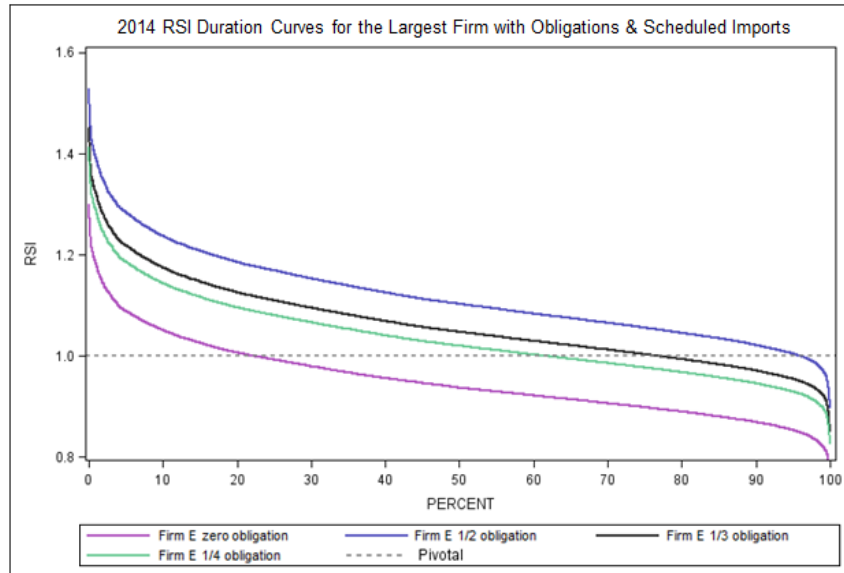
With Obligation + Hourly Import

2013 RSI Duration Curve: Firm E



With Obligation + Hourly Import

2014-2017 RSI Duration Curves: Firm E



Thank you