Report Prepared for the Department of Justice
Antitrust Division

Comments in Response to the Department of Justice Antitrust Division Request for Public Comments on Updated Bank Merger Review Analysis

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Expert Report of Michael D. Noel, Ph.D.

I. Qualifications

1. My name is Dr. Michael D. Noel. I am a Competition Economist and Professor of Economics at Texas Tech University in Lubbock, Texas. My primary field of research is competition policy, which includes the analysis of mergers and acquisitions, market definition, Herfindahl-Hirschman Index (HHI) analyses, unilateral and coordinated effects, and related issues.

2. I have published extensively on competition policy and my research has been widely cited. My research appears in leading professional peer-reviewed journals including *the Review of Economics and*

Statistics, RAND Journal of Economics, the Journal of Industrial Economics, the International Journal of Industrial Organization, Economic Inquiry, and *the Journal of Economics and Management Strategy*. I have given seminars on competition policy on six continents and I am a peer reviewer for more than fifty professional economics journals that publish studies in the area. I teach graduate and undergraduate courses on competition policy, which include a thorough analysis of the U.S. merger review process. I have served as an economic expert in numerous high profile merger reviews in the United States and internationally (e.g. Europe, Canada, Australia) and have advised competition authorities on various merger related issues, including geographic market definition and unilateral and coordinated effects.

3. I hold a Ph.D. in Economics from the Massachusetts Institute of Technology (M.I.T.), as well as a Master of Arts Degree in Economics and a Bachelor of Science Degree (with High Distinction) in Economics, Statistics, and Computer Science, both from the University of Toronto. My C.V. is attached to the end of this report.

II. ASSIGNMENT

4. I have been asked by Happy State Bank (Happy Bancshares, Inc.) to review and opine on questions published by the Department of Justice Antitrust Division (the "Division") on September 1, 2020, in its request for public comments on banking merger review analysis. My initial observations are as follows.

III. COMMENTS ON "GUIDANCE GENERALLY"

A. To what extent, if at all, is it useful to have banking-specific merger review guidance, beyond the 2010 Horizontal Merger Guidelines?

5. It is useful to provide banking-specific merger guidance that highlights and clarifies the Division's general approach as it applies to the banking industry. It helps banks understand the Division's views on issues that frequently arise in banking mergers while at the same time not cluttering the main non-industry-specific document, the 2010 Horizontal Merger Guidelines (HMG). It helps banks avoid the expenses that

can result from unexpected challenges and the risk of missed opportunities that can result from unclear guidance. Any new banking-specific guidance must be complementary to, and not contradictory with, the 2010 HMG.

6. The most recent banking-specific merger guidelines released by the Division, the 1995 Banking Merger Guidelines (BMG), fails in this regard. The 1995 BMG is now twenty-five years out of date and was written at a time when the banking industry was very different than today. It is largely focused on a mechanical HHI screen calculation that is no longer being performed correctly, given the nature of banking competition today, and contains no meaningful discussion of countervailing or offsetting effects. It does not take into account the competitive constraints modern banks face and is not reliable for use in merger analysis. The product and geographic market definitions adopted in the 1995 BMG are at the center of much of the problem.

7. The banking industry has undergone a significant transformation over the past twenty-five years. Long gone are the days of long lines at the bank at lunch hour to do such routine banking tasks as withdrawing some spending cash or depositing a paycheck. Credit cards, debit cards, direct deposit, electronic money transfer, nationwide ATM networks, remote commercial services and online banking and lending have all revolutionized the way consumers and businesses interact with the industry. Fewer and fewer individuals step inside a physical branch anymore, and those that do, do so less and less often. Even significant tasks like opening an account, investing, or applying for a mortgage or small business loan, can easily be done online. Customers do not "travel" to banks anymore as much as banks travel to customers. Banking is as convenient as a computer in one's office or a smartphone or credit card in one's pocket. Direct deposit, auto bill pay, and other automatic services take place quietly in the background without customer intervention. Exhibit A lists some of the major technological changes in the industry over the past few decades.

8. The transformation has significant implications for market definition, which has not always been well recognized. First, it makes geographic banking markets much larger. Banks face competition not just

from other local banks, but from regional and national banks that reach customers online (as they generally do), fully online banks (e.g. Ally Bank), and a wide range of non-bank entities including online and specialty lenders (e.g. Rocket Mortgage, Kabbage, the Farm Credit System associations), investment houses (e.g. Fidelity, Vanguard), closed-loop credit card companies (e.g. American Express, Discover), money transfer and payment systems (e.g. Paypal, Google Pay), and a wide variety of other types of service entities. Competition is not just limited to local banks anymore.

9. It also makes product markets more complex. While the 1995 BMG focuses on metrics that are mainly restricted to traditional banks (e.g. deposits), banks face competition from a multitude of non-bank entities including all those mentioned above. Even if one competitor only offers some of the services that banks provide, collectively they compete with banks on all the services that banks provide. Banking competition is not just limited to traditional banks anymore. Product markets are too complex to be summarized by a single metric, like deposits, and reliance on any single measure can miss important dimensions of competition taking place.

10. The twenty-five-year-old BMG fails to take into account these changes in banking competition today. It predates the transformation and relies on procedures and calculations that are now out of date and inconsistent with the economic principles laid out in the 2010 HMG. It leads to systematic and known errors in merger analysis.

11. I recommend that the 1995 BMG be retired in its entirety and a new guidance document written from the top down, with two goals in mind: (1) to provide specific guidance on the types of issues that frequently arise in banking merger reviews, taking into account the competitive realities of the modern banking industry, and (2) to provide guidance in a way that complements, and not contradicts, the economic principles and best practices laid out in the 2010 HMG.

12. I discuss recommendations for change throughout my report, but five significant deficiencies in the 1995 BMG are worth summarizing up front.

13. First, the 1995 BMG does not include an independent discussion of geographic banking markets but simply adopts the geographic banking markets predefined by the Federal Reserve Board (the "Fed"). Over the years, the Fed has predefined a number of geographic banking markets for use in its merger analyses, mainly for metropolitan areas and some rural areas, and fills in the gaps with new markets on an as-needed basis over time. The reliance on these definitions is one of the greatest sources of bias in banking merger analysis today. The methodology is based on long out-of-date notions of strictly local banking and results in markets that are much too narrowly defined, often egregiously so in rural areas. They are too narrowly defined because they fail to take into account consumer substitution patterns and the set of competitive constraints banks actually face in modern banking today.

14. It is my recommendation that the Fed's current definitions be retired in their entirely and a new set of geographic banking markets, with complete coverage of the nation, be rethought from the ground up. It is a significant task, but one that would provide the most meaningful guidance, and would replace the increasingly arbitrary patchwork that makes up the geographic banking markets currently in use. The new definitions would be rooted in economic principles laid out in the 2010 HMG and take into account the modern nature of banking competition. See Section V.B. and V.C. for further discussion on geographic banking market definition.

15. Second, the 1995 BMG does not contain a meaningful discussion of product markets. It is largely focused on calculating HHI screens using banking deposits as a metric (even though the word "deposits" is not mentioned until the last page), and only briefly mentions that banks can calculate HHI screens using small and medium business loans if needed. It suggests three aggregate product markets, though it is less than clear. A meaningful discussion of product markets and the metrics used to measure market shares in each market must be a central part of the new banking guidelines. The Division should discuss the data sources it uses, what adjustments it makes to its metrics and why, and how it deals with data availability issues. In my experience, data limitations can be significant and are not always well addressed.

16. Consider limitations in the use of bank deposits as a metric for market shares. The Division's preferred metric (according to the 2010 HMG) is revenues, but deposits are not revenues, nor are they the revenues of any product that a bank sells. Nor are they assets. They are a proxy for a bank's capacity to make loans, but loans are only one part of a bank's business, and deposits in any one area are not exclusively reserved for loans in that same area, so there is an inherent mismatch between them. Also, deposits cross into all three of the Division's proposed product markets and thus cannot be a direct measure of any one of them.

17. A limitation of bank deposits that is especially troubling is that many bank competitors are entirely disregarded. Specialty lenders that compete directly with banks for loans but do not take deposits, such as online lenders (e.g. Rocket Mortgage, the largest mortgage lender in the nation) or Farm Credit System associations (which rival commercial banks in combined loan value in agricultural areas), are entirely disregarded. Large online banks (e.g. Ally Bank) whose deposit data is not available on a market-level basis are also entirely disregarded. The default assumption that the market shares of these competitors is exactly zero is not defensible. Credit unions and thrifts that compete directly with banks for loans and other services are arbitrarily downweighted to 50% of actual deposits, which is also not defensible unless these entities are doing nothing with the other 50%, which is unlikely. Exclusions and downweights such as these cause significant, systematic, and known biases in deposit-based HHI screens in virtually every market share calculation in virtually every merger analysis. As a result, the deposit-based HHI screens as they are currently used by the agencies are not reliable for use in merger analysis.

18. Loan values are a useful revenue metric that measures outputs instead of inputs, but have similar data limitations. The most troubling limitation is that many bank competitors are again disregarded. Bank and market level loan data is generally unavailable for banks that do not meet a sufficient size threshold and such banks are generally disregarded. The commonly-used Community Reinvestment Act (CRA) data on commercial loans, for example, excludes all but the larger banks with at least 1.3 billion dollars in assets. The omission is significant and especially severe in rural areas where many banks are small and do not

meet the required threshold. Market-level loan data is also generally unavailable from Farm Credit System (FCS) associations, which rival commercial banks in combined loan value in agricultural areas, and they are disregarded as well.[1] Exclusions such as these cause significant, systematic and known biases in loan-based HHI screens in virtually every market share calculation in virtually every merger analysis. As a result, the loan-based HHI screens as they are currently used by the agencies are not reliable for use in merger analysis. See Section V.A. for further discussion of product market definition.

19. The 1995 BMG contains no discussion of the biases in the HHI calculations. While the HHI screen is only intended to be a screen, in my experience with banking agency reviews, it is often taken to be determinative, and it can be difficult for applicants to successfully point out the inherent biases in the HHI as it is calculated.

20. Problems with product and geographic banking markets and the metrics used to evaluate them need to be rectified in a new set of banking guidelines. Product markets need to be carefully discussed, geographic markets based on current competitive constraints thoughtfully constructed, the choice of metrics and the limitations of those metrics carefully considered, and market shares estimated or imputed (even imperfectly) using the best available information. The resulting HHIs should be free of systematic and known biases. The additional effort can be substantial, but is necessary for estimating a meaningful HHI.

21. If traditional merging banks already pass the HHI screen, in spite of biased and inflated market shares, and before the disregarded competitors are included, then the additional data collection effort will generally not be necessary.

22. Third, and putting aside the biases in the market definition exercise, the 1995 BMG is inconsistent with the 2010 HMG simply because it relies on different HHI thresholds. I understand that thresholds are

[1] Morris, C., Wilkinson, J, and Hogue, E. (2015). "Competition in Local Agricultural Lending Markets: The Effect of the Farm Credit System", *Economic Review*, Federal Reserve Bank of Kansas City.

inevitably arbitrary to a degree, but there is no economic basis for applying a different set of thresholds to the banking industry than to other industries, provided the market definition exercise is carried out properly.

23. The reason for the discrepancy is simply that the 1995 BMG thresholds are out of date. They are based on thresholds that were first introduced almost forty years ago in the 1982 HMG and were still a part of the then-current guidelines from 1992. It is easily fixed. See Section IV.A. for further discussion.

24. Fourth, the 1995 BMG contains no meaningful discussion of offsetting or countervailing effects, as those terms are used today. It makes no allowance for efficiency effects in particular, which is surprising because cost and innovation efficiencies are important motivations driving banking mergers today. The minimum efficient scale in the industry is increasing. Electronic and online technologies have broken down the location barrier to entry, and large and efficient competitors can now reach out to customers outside the areas where they have a physical presence, if they have a physical presence at all. Low-cost online banks and lenders have become very popular, and most large traditional banks now offer an efficient and expansive set of electronic and online services that consumers and businesses across the country have increasingly come to expect.

25. Efficiencies are important in a technologically-advanced industry but especially important for smaller local and regional banks who face increasingly aggressive competition from their larger counterparts. Smaller, less efficient or less technologically advanced banks will have a more difficult time competing and are at higher risk for long term failure (the vast majority of bank failures are exactly these kinds of banks). Mergers are an important tool for emerging banks to achieve the economies of scale needed to effectively compete in today's industry.

26. An unfortunate irony is that many of the mergers likely to generate the greatest efficiencies are among smaller local and regional banks in rural areas, but this is also where biases in product and geographic market definition inflate HHIs the most, and the potential for policy error is the greatest. In other words, the biases embedded in the merger review analysis, disproportionately affecting rural areas, results in an unintentional inversion of the goals of merger policy – preventing some of the smallest, least

harmful, and most efficient mergers from taking place. See Section VI.A for further discussion on efficiencies in rural area mergers.

27. The new set of banking-specific merger guidelines should include a discussion of efficiencies (and the related issue of failing firms) and their importance in the banking industry. Efficiencies are discussed in some detail in the 2010 HMG but not at all in the 1995 BMG and they are not always afforded the conversation they deserve in banking agency reviews.

28. Fifth, the 1995 BMG section entitled "Additional Analysis" highlights how very out of date the 1995 guidelines have become. At first, the section appears to be a discussion of countervailing effects – reasons why adverse competitive effects may be unlikely post-merger even if market concentration is high. The 2010 HMG discusses many such reasons, for example, efficiencies, potential entry, the presence of powerful buyers, and failing firms. But upon closer inspection, this is not what the section is. It is largely a list of reasons why the HHI, when calculated as instructed in the worksheets attached to the guidelines, may still be calculated incorrectly and be biased.

29. There are three significant problems. One, a meaningful discussion of actual countervailing effects is missing. Whereas the discussion of countervailing effects in the 2010 HMG begins with a correctly calculated HHI and focuses on relevant competitive issues that may be important but cannot be captured by a correctly calculated HHI (e.g. efficiencies), the 1995 BMG is focused almost solely on calculating the HHI and discussing reasons why the calculation itself may be wrong. Two, and importantly, the HHIs, when calculated as instructed, are essentially <u>always</u> wrong. The geographic banking markets used in these analyses are narrowly defined, often egregiously so, and a substantial portion of actual competition that merging banks face, local and non-local, bank or non-bank, are either downweighted or entirely disregarded. Three, perhaps not recognizing that the HHI calculations are systematically biased, the 1995 BMG then requires applicants to prove and reprove time and time again that the HHI they calculated, in the manner they were instructed to calculate it, is wrong and not meaningful to their situation. It creates a wasteful exercise in which applicants are instructed to calculate a wrong HHI and then prove each time that

it is wrong. More problematically, if the HHI screen is taken to be determinative, and in my experience it often is, it can deter pro-competitive mergers and unintentionally harm banking competition in the long run.

30. Going through some examples of the "additional analyses" is instructive. The idea behind these analyses is that if the calculated HHI exceeds the threshold, merging firms can appeal to one of the listed exceptions to argue that competition is unlikely to be harmed post-merger anyway. But what is immediately obvious is that almost all of the listed exceptions are almost always true. The exceptions are not really exceptions then, but the rule. Some examples:

31. *"Evidence that rapid economic change has resulted in an outdated geographic market definition, and that an alternate market is more appropriate"*. This exception is the rule. The 1995 BMG adopts the Fed's geographic market definitions which are based on an out-of-date strictly local model of competition. It does not take into account the technological changes in the industry and how consumers and businesses do their banking today. Fewer and fewer people regularly access physical bank branches anymore and an increasing number rarely if ever enter into a branch. Consumers and businesses have access to much larger set of competitors, irrespective of location, and the old local model of competition is no longer sufficient.

32. *"Evidence that market shares are not an adequate indicator of the extent of competition in the market"*. This exception is also the rule. The 1995 BMG focuses largely on deposit shares which, as discussed, systematically exclude a wide range of competitors that either do not take deposits (e.g. lenders such as Rocket Mortgage or Farm Credit System associations) or do not make deposit information publicly available on a market basis (e.g. online banks such as Ally Bank). It arbitrarily downweights credit unions and thrifts to 50% (on the idea that they often provide fewer services), but there is no economic justification for downweighting or outright excluding legitimate competitors in a properly defined product market. The assumption that the market shares of these firms are exactly zero (or 50% of deposits in the case of credit unions and thrifts) creates systematic and known biases in the HHI calculations in essentially every situation.

33. *"Evidence concerning entry conditions, including evidence of entry by institutions within the last two years and the growth of those institutions that have entered; evidence of likely entry within the next two years; expectations about potential entry by institutions not now in the market area".* This exception is also the rule, and demonstrates how out of date the guidelines have become. The calculated HHIs systematically exclude a vast assortment of competitors, including online banks (e.g. Ally Bank), online lenders (e.g. Rocket Mortgage, Kabbage), Farm Credit System associations, specialty providers (investment houses, closed loop credit card systems, money transfer services and apps, foreign exchange, and so on), and out-of-area traditional banks that can now easily reach local customers through electronic and online means. The BMG discusses past entry (in the last two years) but surprisingly much of this entry is decades old and is still not counted. It is unimaginable that past entry should not already be included in the HHI calculations. In terms of the potential for future entry and future expansion of entrants, which is an actual countervailing effect (and a rare overlap with the 2010 HMG), there is every reason to expect continued entry and expansion of online banks and lenders, specialty providers, and out-of-area traditional banks. Markets are now regional in nature (and nationalizing over time), and mergers of smaller local and regional banks especially are often driven by the need to meet the competitive challenges of their larger and more efficient counterparts, no longer bound by the limits of physical distance.

34. *Evidence of actual competition by out-of-market institutions for commercial customers,* and *Evidence of actual competition by non-bank institutions for commercial customers.* This exception is also the rule. Non-local banks that service commercial customers are systematically excluded from HHI calculations by out-of-date geographic market definitions. Non-bank institutions (including Farm Credit System associations) are systematically excluded from HHI calculations due to data availability issues or out-of-date notions that only true banks matter. Even competitors that are local and are banks are often excluded from HHI calculations due to data availability issues. The commonly-used Community Reinvestment Act (CRA) loan data, for example, excludes all banks that have less than 1.3 billion dollars in assets, missing a significant degree of loan competition. The default assumption that the market shares

of these banks are exactly zero creates systematic and known biases in the HHI calculations in essentially every situation.

35. For all the reasons discussed above, the 1995 BMG is in dire need of replacement. The new document would provide meaningful updated guidance on product and geographic banking market definition that takes into account the competition modern banks face today. It would discuss how to calculate the HHI with the best available information and would not rely on assumptions that are known to be biased. It would emphasize that the HHI screen is a first step in the analysis and would discuss the potential for countervailing effects such as efficiencies. It would not be what the 1995 BMG discusses now – a perhaps unintentional listing of the major biases in its product and geographic market definition exercise.[2] The new guidelines would provide meaningful guidance that helps applicants decide whether or not to proceed with a potential merger, and enables agencies to more accurately target those mergers that are likely to have adverse competitive effects.

B. To what extent, if any, does the industry need greater clarity on how the Division applies the 2010 Horizontal Merger Guidelines in its investigations?

36. The 2010 HMG lays out the Division's general approach to merger review applicable across all industries and is best kept as a non-industry-specific document. While I have thoughts on how to improve certain aspects of the 2010 HMG, these are not specific to banking mergers and are best addressed in another forum. A separate and new Banking Merger Guidelines document is, in my opinion, the best method to provide additional guidance on the Division's approach to issues that frequently arise in banking mergers.

C. To what extent, if any, is it helpful to have joint guidance from the Antitrust Division and the banking agencies, i.e. the Federal Reserve Board of Governors (FRB), the Office of

[2] Another example, *"Evidence that the merging parties do not significantly compete with one another",* is reflective of the problem. It is an admission that the product and geographic markets may make no sense at all. A post-merger HHI will not increase if the two parties do not compete with each other, because non-competing parties are by definition not in the same product and geographic market. If the HHI does increase, the product and geographic markets make no sense.

the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC)?

37. It would be convenient to have a single document from all four agencies in agreement, but the most important and immediate issue is that the new guidance from the Division be economically sound and consistent with the economic principles laid out in the 2010 HMG. While I am not privy to the internal views of the banking agencies, there are significant issues in the way banking mergers are currently evaluated, as discussed throughout this report (e.g. geographic market definition, exclusion of known competitors, countervailing effects considerations), and I hope there would be agreement on fixing these issues and updating the guidelines in a unified way. In such a case, a four-agency BMG document would be ideal. But a four-agency document that would compromise on the economic principles laid out in the 2010 HMG is discouraged.

38. Should there be multiple agency documents, it would be most useful for each agency to produce its document in the form of a stand-alone memorandum document (rather than a list of frequently asked questions only, for example). Each agency would format its document similarly, for easier comparison, and highlight areas of disagreement between itself, the other agencies (including the Division), and the 2010 HMG. It would provide background and justification for any differences in approach. Since the information provided by the agencies comes in piecemeal fashion currently, in the form of FAQs or past publications or bulletins, a more consistent and coordinated approach would be helpful.

IV. COMMENTS ON "HERFINDAHL-HIRSCHMAN INDEX (HHI) THRESHOLD"

A. Should the screening thresholds in the 1995 Banking Guidelines be updated to reflect the HHI thresholds in the 2010 Horizontal Merger Guidelines?

39. Yes, the screening thresholds in the 1995 BMG should be updated to match those in the 2010 HMG. There is no basis for applying a different set of thresholds to the banking industry, provided the market definition exercise is carried out properly in the first place. The discrepancy occurs only because the 1995

BMG is long out of date. The threshold in the 1995 BMG derives from the then current 1992 HMG, which divided markets into unconcentrated, moderately concentrated, and concentrated markets, using HHI cutoff thresholds of 1000 and 1800. These thresholds were introduced almost forty years ago in the 1982 HMG, and had fallen out of date by the 1990s. The thresholds were updated to 1500 and 2500 in the 2010 HMG, reflecting more recent agency experience, and the 1995 BMG simply lags behind the change. It is easily fixed.

V. COMMENTS ON "RELEVANT PRODUCT AND GEOGRAPHIC MARKETS"

A. Depending on the transaction, the Division generally reviews three separate product markets in banking matters: (1) retail banking products and services, (2) small business banking products and services, and (3) middle market banking products and services. Are there additional product markets that the Division should include in its analysis?

40. The three product markets are suitable for most banking merger analyses. They are necessarily simplifications, of course, since banks are multiproduct firms that offer a wide variety of related financial and technology services. If meaningful competitive concerns surround a particular service, a finer product market could be considered in those particular instances.

41. As discussed above, it is important to carefully consider the metrics used to estimate market shares in each of the product markets. Banks face competition from a wide variety of bank and non-bank entities – national and online lenders, farm bureaus, credit unions, venture capitalists, brokerage and investment houses, money transfer services and apps, currency distribution, closed-loop credit card companies, prepaid cards, commercial assistance, foreign exchange services, secure storage, and many others. Many competitors compete along a few lines of business, but collectively these companies compete with banks on the full suite of products and services that banks typically offer.

42. The 2010 HMG discusses several potential metrics for general use, with revenues being the most common. But in banking markets, the most common metric is deposits and, in secondary analyses, loans.

Earlier, I discussed the limitations of each. Deposit-based metrics, which are not a measure of bank revenues or even the revenues of any product that a bank sells, excludes many legitimate competitors that compete with banks but that do not take deposits, including online and investor-funded lenders. Loan-based metrics are closer to revenues but exclude many legitimate competitors that compete with banks but do not issue loans, including most specialty service providers. Large numbers of legitimate competitors are excluded under both metrics due to data availability issues or arbitrary adjustments. These lead to biased measures of market shares and HHIs and subsequent errors in merger analysis. It is important to estimate (and not exclude) the market shares of competitors even if ideal data is not available. Multiple metrics can be used to provide a more rounded understanding of the competitive constraints banks actually face.

B. The 1995 Banking Guidelines specify that the Division screens bank merger applications using the FRB-defined geographic markets and/or at a county-level. Should there be other geographic market definitions used in the screening process? If so, what should they be and why?

43. I recommend that the current set of geographic banking markets be retired in their entirety, and geographic banking markets be rethought from the bottom up. The current set of markets as defined by the Fed are a significant source of error in banking merging analysis today. The reason is that they are based on a model of strictly local competition that does not take into account the way modern consumers and businesses bank. Markets are defined too narrowly, often egregiously so, resulting in HHIs that are systematically biased and unreliable for use in merger analysis. Since current market definitions no longer reflect consumer substitution opportunities and the set of competitive constraints that banks face, they are inconsistent with the economic principles laid out in the 2010 HMG and should be reconsidered.

44. This is true even for recently defined markets, which rely on the same older approach. In fact, these often contain the greatest errors, since they generally involve the rural spaces between large metropolitan areas and the degree of arbitrariness tends to be the highest in these areas. Geographic banking markets are defined so narrowly in many rural areas that the HHIs derived from them are essentially meaningless.

45. It is instructive to go through a short history of how we got here. Fed economist Nisreen Darwish describes in a Chicago Fed Letter published in 2014, that the 1963 Supreme Court opinion "to consider a bank's geographic market to be its local area remains the foundation of the Fed's delineation of banking markets."[3] The Court's guidance, in *U.S. v. Philadelphia (1963)*, states: "In banking, as in most service industries, convenience of location is essential to effective competition. Individuals and corporations typically confer the bulk of their patronage on banks in their local community; they find it impractical to conduct their business at a distance" and "The factor of inconvenience localizes banking competition as effectively as high transportation costs in other industries."[4]

46. The Court emphasized the importance of "convenience" which in 1963 meant that a bank branch had to be within a short walk or drive from home or work. Since a consumer needed to go in and speak with a teller to perform even basic and routine banking tasks, such as depositing or withdrawing cash, cashing checks, or updating passbooks, and to do so on a frequent basis, "convenient" and "local" were synonymous at that time. But this is no longer true today.

47. Some readers may remember a long-ago time when waiting in long lines at the bank at lunch hour, just to do routine banking tasks like withdrawing cash or depositing a paycheck, was normal. Earlier I discussed that credit cards, debit cards, direct deposit and other electronic money transfers, nationwide ATM networks, remote commercial services and online banking and lending have revolutionized the way consumers and businesses do their banking. Fewer and fewer individuals step inside a physical branch anymore, and those that do, do so less and less often. Even significant tasks like opening an account, investing, or applying for a mortgage or small business loan can easily be done online. Accessing banking services today is as convenient as logging on to a computer or reaching for a smartphone or credit card.

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[3] Darwish, N. "Keeping Banking Competitive: Evaluating Proposed Bank Mergers and Acquisitions", *Chicago Fed Letter*, Federal Reserve Bank of Chicago, May 2014.

[4] United States v. Philadelphia National Bank et al., 83 S. Ct. 1715 (1963).

Many automatic services (direct deposit, bill pay) take place quietly in the background without any customer intervention at all.

48. In a 2018 survey conducted by the American Bankers Association, only 18% of respondents stated that in-branch banking was their preferred method of service. Another 80% of respondents stated that non-branch delivery channels were their preferred method, with internet and mobile banking accounting for the vast majority (72%).[5] This represents a significant reversal from the world of 1963. In fact, some banking services are so intrinsic to everyday life today that many respondents may not recognize that every time they use a debit or credit card, or have a paycheck deposited or a bill paid automatically, those are also banking services. The shift is only going to continue – younger people are most likely to express a preference for internet and mobile access (79% for ages 18-34), and least likely to express a preference for branches (13%). Branches will continue to become less and less important going forward.

49. This has been known for some time. In a study documenting the early days of online banking, Fed researchers Dean Amel, Arthur Kennickell and Kevin Moore find that, even by 2004, "the Internet has become an important means of accessing financial services regardless of the location of the institution; at the same time, it may also have facilitated the discovery of non-local institutions or the opening on non-local accounts".[6] They find "a steady decline in the shares of accounts and loans at local institutions" and that "In 2004, 57 percent of households used at least one non-local provider of financial services."[7] This is back in 2004. The trend has only grown stronger in the sixteen years since.

50. The problem with the fifty-seven-year old Court guidance from 1963 is that it predates the technological transformation in the banking industry and does not take into account the competitive options

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[5] American Bankers Association. "Preferred banking methods infographic", September 2018. Available at https://www.aba.com/news-research/research-analysis/preferred-banking-methods , last accessed September 18, 2019.

[6] Amel, D., Kennickell, A., and Moore, K. "Banking Market Definition: Evidence from the Survey of Consumer Finances". Finance and Economics Discussion Series, Federal Reserve Board, 2008.

[7] *Ibid*.

that consumers and businesses have today. New electronic and online service delivery channels for banking products and services break the synonymy between "convenience" and "local" that the Court discussed in 1963. They vastly increase the number of banks and other entities that are viable substitution to customers and businesses, and this makes geographic banking markets larger.

51. It actually makes them larger in two ways. First, there are increasingly more consumers and businesses that rely almost exclusively on electronic and online services rather than physical bank branches (e.g. online banks or online lenders) and this works towards larger, regional markets (and, in time, national ones). Second, for consumers and businesses that still prefer physical branch access, they are less likely to go into a branch for frequent and routine tasks (such as withdrawing cash, deposit checks, or making payments on a loan) and more likely to reserve branch visits for more infrequent and significant banking tasks (e.g. applying for a loan). Customers shop more widely for these more infrequent and significant items, and this works towards regional markets as well.

52. The current COVID-19 pandemic emphasizes just how optional branches have become to the banking experience today. While one might miss going to a favorite restaurant or a live sporting event, attending a class or going to the movies, few consumers or businesses experience any interruption in banking services. Reaching for a debit or credit card, accepting a debit or credit card, withdrawing spending cash at one of the half-a-million ATMs nationwide, applying for a mortgage or business loan, making a payment on a credit card or loan, and so on, all continue electronically or online without supply-side interruption. Automatic bill pay and direct deposit continue to be automatic. Perhaps the only function that requires a physical branch visit today involves the few consumers that still have a safety deposit box at a bank. Safety deposit boxes were always a tiny fraction of a bank's business, and now with easy software encryption of important documents and fireproof home safes for other items, it is that much smaller today.

53. An early recognition of the expanding nature of a bank's geographic reach dates all the way back to 1974, when it was argued in *U.S. v. Connecticut (1974)* that a *state-level* competitive effects analysis, and not just a local one, was necessary to evaluate potential competitive effects post-merger. Ironically, it

was the Department of Justice – and not the merging banks – who made this argument.[8] The Court affirmed its 1963 decision but emphasized that "the Government cannot rely only on Standard Metropolitan Statistical Areas" or "town boundaries" and that it "must make a determination as to the geographic market in which each of the banks operates and to which the bulk of its customers may turn for alternative commercial banking services".[9] Forty-six years later, consumers and businesses have many alternative choices to which they can turn, and are not limited by MSA or town or county boundaries anymore.

54. The Fed's methodology has not kept pace with these changes. As an example, the Fed writes that it places much weight on *daily* commuting patterns, based on the idea that consumers and businesses are likely to be restricted to only those banks they physically drive past each day.[10] However, few consumers and businesses need that frequent a level of branch access today, if they need any access at all. In rural areas, where towns are often only a few miles across and the nearest big city may only be an hour or two away, daily commuting patterns are largely meaningless. For rural residents, even an occasional supply run into a regional hub city is more than sufficient to visit one of dozens of banks in that hub city for infrequent and significant tasks. Obviously, daily commuting patterns are irrelevant altogether for the growing number of customers that do their bank electronically and online.

55. The transformation of banks and other entities from brick-and-mortar operations to largely electronic and online operations is fundamental and forces us to rethink geographic banking markets. The 2010 HMG presents two different approaches to defining geographic markets – markets based on the location of the firms ("firm-centric") and markets based on the location of its customers ("customer-centric"). The 2010 HMG states that the former applies when "customers receive goods or services at suppliers' locations" and the latter applies when "suppliers deliver their products or services at customers'

[8] United States v. Connecticut National Bank 418 U.S. 656 (1974). The merging banks had already agreed prior to the case to divest branches in the minimal area of local overlap. The Department of Justice argued against the merger on the grounds of state-wide effects.

[9] *Ibid.*

[10] Norwest Corporation. 84 Fed. Res. Bull. 1088, 1091 n. 19 (1998).

locations".[11] The banking industry was clearly the former in the 1960s, but has since shifted mostly into the latter. Banks now travel to you. Banking is increasingly customer-centric and distance to a branch is less and less important.

56. The question then is not how far consumers and businesses will travel to go to a bank branch but rather: What competitive banking choices do consumers and businesses in any given area have? Customers today can select among a range of local banks, banks outside their local area, online banks, and a wide variety of local, regional, and national non-bank entities, including online lenders and service providers. Prices are sometimes nationally set and sometimes regionally set. Taking the smaller of these, this makes geographic banking markets regional in nature, not local.

C. Should the geographic markets for consumer and small business products and services still be considered local?

57. No. Geographic banking markets for consumer and small business products are no longer local, they are regional in nature at a minimum. This question is closely related to the previous question (Section V.B.) and I include by reference my response to that question here.

VI. COMMENTS ON "RURAL VERSUS URBAN MARKETS"

A. The dynamics of rural and urban markets can differ significantly. In what ways, if at all, should these distinctions affect the Division's review?

58. Rural and urban areas differ significantly and these differences must be taken into account when applying the economic principles laid out in the 2010 HMG. The underlying principles from the 2010 HMG do not change, but the economics of these areas are different, so the outcomes will often be different, and this has not always been recognized.

[11] Department of Justice Antitrust Division and Federal Trade Commission. 2010 Horizontal Merger Guidelines. Section 4.2.

59. I present two concrete examples. The first concerns geographic market definition in rural areas, and the second concerns potential efficiencies in rural area mergers.

60. I begin with geographic market definition. Earlier, I discussed that the approach taken by the Fed and adopted in the 1995 BMG is based on an out-of-date notion of local banking and results in geographic banking markets that are too narrowly defined.

61. The problem is especially pronounced in rural areas. Obviously, rural areas have access to all the same electronic and online services as urban residents, and the same biases exist there. But the decreased reliance on physical bank branches, for those that still want branch access, disproportionately expands rural geographic banking markets relative to urban ones. The key to understanding this is understanding the differences in rural and urban life. Small rural counties and communities often contain only have a few thousand people or maybe a few tens of thousands of people. There may be a few banks on Main Street, a small supermarket, some agricultural supply stores, and perhaps a few basic fast food or restaurant options for immediate needs. But many of the services that urban residents take for granted – large department stores, big-box stores, specialty retailers, malls, dealerships, auto repair, the full range of dining options, recreational activities, colleges and universities, sporting facilities, golf courses, parks and so on – are rarely present in a rural town. Rural residents would need to make the occasional trip into a nearby regional hub city for these things. In the general area where I live in Northwest Texas, there are two hub cities – Lubbock and Amarillo. The hub city is often only an hour or two away and is an easy drive on uncongested and open rural highways and interstates.

62. A hub city would not have been a convenient banking option to rural residents in the 1960s, where everyday branch access was necessary, but that is not true today. Relatively few people visit physical branches for frequent and routine tasks and are more likely to reserve branch visits for infrequent and significant tasks, if at all. It is not inconvenient to stop into a branch in a nearby hub city from time to time when already there for other reasons. This makes rural area geographic banking markets regional in nature and – at a minimum – attached to a full-service supply hub city.

63. In short, small rural cities and towns that have few banks have few of everything else, and are not economically self-contained areas like a large metropolitan area would be. It makes no sense to think of them as separate banking markets, or as scaled-down replicas of a large metropolitan area.

64. This is not properly reflected in the geographic banking markets defined by the Fed and adopted by the 1995 BMG. One might expect to see larger regional-based markets in which economically integrated rural areas are combined with respective hubs, reflecting the social and economic integration of these areas, but this is not the case. It appears that the defined geographic banking markets for rural areas are based on drawing arbitrary circles (and squares) around small rural population centers, that are not meaningful banking markets in any sense, and creating scaled-down replicas of large metropolitan area markets. It leads to egregiously narrowly defined banking markets in many rural areas. There are two related errors – 1) not taking into account the modern competitive choices that rural area residents have today, and 2) superimposing urban concepts (e.g. *daily* commuting patterns, bank branching patterns, and public transportation routes) onto rural areas where they do not apply.

65. Some examples illustrate. Consider my home state of Texas and the largest predefined banking markets in that state. The predefined Houston area banking market consists of Houston and its surrounding suburbs, and includes all or parts of ten different Texas counties. The predefined San Antonio market consists of six counties, the predefined Austin market consists of five, and the predefined Dallas and Fort Worth markets consist of six counties each. In each case, boundaries are drawn around the built-up population area and ends where the open farmland and ranchland begin (except the awkward division through the middle of the DFW metroplex). According to Google Maps, it takes approximately three hours to drive from one end of the Houston area banking market to the other on a typical weekday morning, and approximately two hours to drive from one end to the other in other metropolitan area markets. Each large city contains over a hundred thousand brick-and-mortar businesses providing all the products and services large city residents come to expect, putting aside countless other online choices.

66. Now consider examples of rural area banking markets defined in Texas. The defined geographic banking market of Matador, in northwest Texas, consists of a single county. Matador is the largest town in Motley County, with a population of 700 (the whole county having a population of 1200). The town is only one mile wide. According to Google Maps, there are two restaurants in Matador, a café and a restaurant inside a motel, a small grocery store, and a small number of shops. It should be obvious that Motley County is not an economically self-contained metropolitan area and there is no reasonable sense in which the one and only bank in Motley County constitutes a separate banking market.[12] Residents access most products and services from one of the area's hub cities, Lubbock or Amarillo, where they have access to dozens of physical banks, even setting aside online options.

67. The defined geographic banking market of Wellington is another example of a single county market. The market consists only of Collingsworth County, with a population of 3000. Wellington is the largest city in Collingsworth County, with two-thirds of the county's residents, and is just one mile across from east to west. According to Google Maps, there are five small restaurants in Wellington and a seasonal kiosk that sells snow-cones. There is a Dollar General, a tire repair shop, a few gas stations, and a small assortment of shops. Collingsworth County is not an economically self-contained metropolitan area and there is no reasonable sense in which the two (and only two) banks in Wellington are a separate banking market. Residents access most products and services from Amarillo, where they have access to dozens of physical banks, setting aside online options.

68. There are other examples. The Snyder defined geographic banking market was defined earlier this year and contains only a single rural county, Scurry County. Snyder, the largest city with a population of 11,000, is equidistant to three major supply hubs, Lubbock, Midland-Odessa, and Abilene (ten to twenty times as large), and is easily connected to these cities by open rural freeways. The Eastland defined geographic banking market does not even make up a full county but only a part of a county, Eastland

[12] There is also a Farm Credit System lender, which is erroneously disregarded in HHI calculations.

County, along I-20. The city of Eastland, the largest city in the county with a population of 4000, is a short drive from Abilene (thirty times its size) and an easy trip to Dallas Fort-Worth (two thousand times its size). The Mineral Wells defined geographic banking market contains only Palo Pinto County and a tiny notch out of Parker County. The city of Mineral Wells, the largest city in the market with a population of 16,000, and is a short forty-minute drive to the Dallas Fort-Worth metroplex (five hundred times its size). The Granbury defined geographic banking market consists of two extra small counties (Hood and Somervell Counties, which have a smaller combined area than most single Texas counties) and these counties are actually *inside* the Dallas Fort Worth MSA itself. Yet the Granbury defined market has been arbitrarily separated from Dallas-Fort Worth. Granbury, the largest city in the market with a population of 8,000, and is just twenty miles away from built-up areas inside the city of Fort Worth. Residents in all these "markets" have vastly more physical bank choices than their narrowly defined geographic banking markets would suggest, even before considering the spectrum of online options.

69. Other defined markets that involve more than a single rural county are no more reasonable. The Hereford defined geographic banking market is based around the city of Hereford, a small city with a population of 15,000. Hereford has modest services commensurate with its size but its residents must rely on the much larger city of Amarillo to the east for the full range of products and services. Hereford is a short forty-five-minute drive from Amarillo on an open rural interstate. Hereford is not an economically self-contained metropolitan area and there is no reasonable sense in which it is a separate banking market, cut off from its large supply hub to the east. If Hereford were forty-five minutes away from downtown Houston, Dallas, or San Antonio, it would be well inside that defined geographic banking market.

70. The Plainview defined geographic banking market does not contain any complete county at all but is made up of small pieces of three different counties in an awkward oblong shape. The largest city in the market is Plainview, a small city with a population of 20,000, near the eastern edge of the market. Plainview has a modest set of services commensurate with its size but its residents rely on the much larger city of Lubbock to the south for the full range of products and services. Plainview is a short forty-minute drive

from Lubbock on an open rural interstate. Plainview is not economically self-contained and there is no reasonable sense in which it is a separate banking market. If Plainview were forty minutes away from downtown Houston, Dallas, or San Antonio, it would be well inside that defined geographic banking market.

71. The Lamb County defined geographic banking market is based around the city of Littlefield, a city with a population of 6,000. Littlefield has few services but is a short thirty-eight minute drive from Lubbock. Littlefield is not economically self-contained and there is no reasonable sense in which it is a separate banking market. If Littlefield were thirty-eight minutes away from downtown Houston, Dallas, or San Antonio, it would be well inside that defined geographic banking market. There are numerous other examples.

72. Open farmland or ranchland may give the illusion of distance when viewed through an urban lens, but are not, by themselves, determinative of a market's boundaries, as the 1974 Court noted. The set of banking alternatives to which consumers and businesses can turn, in response to a post-merger price increase, is. While consumers are unlikely to drive from one metropolitan area, such as Dallas, across miles of open farmland to another, such as Houston, for the sole purpose of accessing a physical bank branch, rural area residents regularly drive across open farmland to neighboring towns and hub cities for many reasons, both economic and social. It is not inconvenient for rural residents to visit a physical bank branch in a hub city, assuming they want a physical branch in the first place, when they are in that city for other reasons already. It makes no sense to assume that residents of a place like Matador would never leave their tiny town, or that residents of Littlefield would never spend the half an hour it takes to visit a city forty times its size and access the full range of products and services there, including dozens of physical banks. Or shop more widely for better deals on large purchases like a mortgage or a farm loan. And then there is the spectrum of online options. The number of customers that still restrict their choices to physical bank branches even for major items is getting smaller all the time.

73. Defining geographic banking markets too narrowly in rural areas has significant consequences for banking competition policy in these areas. Rural counties may only have a handful of physical bank branches, so that any merger with even minimal overlap in a rural city or town will almost certainly lead to deposit-based HHIs exceeding the threshold. A recent study by the St. Louis Fed shows that 88.8% of rural banking markets, when defined too narrowly as counties, already exceed the HHI screen threshold prior to any merger and are, in the author's words, "stuck".[13] The average HHI across such markets exceeds 3400. Any merger with any overlap in these areas would be challenged or stopped, indiscriminately including pro-competitive mergers, and only because of a flawed geographic market definition that inflates HHIs.

74. Over time, the rural geographic banking markets defined by the Fed have grown into a patchwork of arbitrarily and much too narrowly defined markets in the rural spaces between large cities. There are countless inconsistencies and, as the map continues to be filled in over time on an as-needed basis, it only gets more arbitrary. Northwest Texas is an excellent example of a patchwork of arbitrarily-defined markets that makes no sense as economic markets and is unworkable going forward.

75. It needs to be rethought from the ground up. Geographic banking markets have historically been taken to be firm-centric, but markets based on a customer-centric approach is now more appropriate. Banks travel to consumers and businesses more than consumers and businesses travel to banks. Markets are likely to be similar in size under either approach, provided firm-centric markets still take into account banks and non-bank entities that offer services to customers inside a given area, whether or not they have a physical branch presence in the area. They are, after all, on your computer and in your pocket. This implies that markets are regional in nature at a minimum.

76. In the area with which I am most familiar, northwest Texas, this would result in at most two separate and distinct geographic banking markets, one for the South Plains (centered on Lubbock) and one for the

[13] Meyer, A. (2018). "Market Concentration and Its Impact on Community Banks". Federal Reserve Bank of St. Louis.

Panhandle (centered on Amarillo). Exhibit B shows a map of the recommended geographic banking markets I recently developed for these areas. These are *minimum* sizes of geographic banking markets in these areas.

77. To fix the problem more broadly, I recommend that a new and complete geographic banking market map be drawn for the nation as a whole, in line with the economics principles in the 2010 HMG, and without holes and gaps. The holes and gaps are currently substantial – eighteen of the forty-four counties (41%) in the South Plains and Panhandle regions discussed above are wholly or partially undefined – creating uncertainty for banks seeking to merge and modernize their offerings in these areas. The new map will be a significant collaborative effort, but will provide the best guidance, and prevent the inevitable inconsistencies that come with markets defined in a piecemeal fashion by different analysts at different times with potentially different goals in mind. The map can be amended over time as new information becomes available, and the integrated national approach will ensure that any changes are applied in a consistent way nationally.

78. This brings me to the second example of how urban ideas applied to rural areas can be misleading for merger review – efficiencies. Efficiencies are nowhere mentioned in the 1995 BMG. Yet efficiencies are especially high in many rural area mergers because of the nature of the targets – many targets are smaller, less efficient, and less technologically advanced than their larger counterparts. Absent economies of scale and the ability to offer the latest banking and security technologies that consumers and businesses have come to expect, many of these banks find it difficult to compete and are at greater risk of eventual failure. Merger activity in rural areas is often necessitated by the need to keep pace with the increasing minimum efficient scale in the industry. Some consolidation of local and regional banks is not only expected but generally pro-competitive.

79. I have seen small rural area mergers that appear to show deposit-based HHIs high in the 3000s (as calculated using much too narrowly defined county-based geographic market definitions, and disregarding or downweighting competitors as is currently done), and yet having no realistic chance of adverse competitive effects. It emphasizes how uninformative the calculated HHIs have become, with out-of-date

definitions and arbitrary exclusions of competition. The aforementioned St. Louis Fed article, which shows that almost ninety percent of rural counties are "stuck" with inflated HHIs above the current threshold regardless of the competitive reality on the ground, implies that efficiency-motivated mergers in these areas will repeatedly encounter this problem, and lead to predictable policy errors.

80. In my experience with banking agency reviews, it can be difficult for banks to overcome a failed HHI screen, even if known to be biased, and even when efficiency effects are strong. This disproportionately affects smaller banks and banks in rural areas, since efficiency motives are often strong in these areas but even the slightest overlap in physical branches can significantly inflate the HHI, given much too narrowly defined markets and the arbitrary exclusion of most sources of competition. Efficiencies are not always afforded the conversation that they deserve and this needs to be rectified. Otherwise, many pro-competitive rural area mergers may be unintentionally pre-empted and banking competition unintentionally harmed.

B. Should the Division apply different screening criteria and HHI thresholds for urban vs. rural markets? If so, how should the screening criteria and the thresholds differ?

81. No, it is not necessary to apply different screening criteria or HHI thresholds for urban versus rural markets. The same thresholds can be used provided that the product and geographic banking markets are properly defined in the first place. I discussed above that rural area geographic banking markets are arbitrarily and much too narrowly defined, often egregiously so, inconsistent with the economic principles laid out in the 2010 HMG. I discussed that significant sources of competition are systematically disregarded as well. Both biases significantly inflate the HHIs in these areas. Once more meaningful regional geographic banking markets are adopted, and all significant sources of competition are considered, the HHI thresholds can remain the same for both urban and rural markets.

82. Having said that, it is always important to recognize that the HHI screen is intended only to be a screen, and is not intended to be determinative as is sometimes taken to be. Efficiencies are exceptionally

important in many rural area mergers, which will often exceed the HHI threshold even in a properly defined market, and these countervailing effects must be given due consideration.

C. The Division often considers farm credit lending as a mitigating factor. Is there a more appropriate way to measure the actual lending done by farm credit agencies in rural markets?

83. The general principle is to use the best available information and not arbitrarily "zero out" competitors. The Farm Credit System (FCS) associations represent a substantial competitive constraint on traditional banks in rural areas and must be taken into account. A recent study by the Kansas City Fed shows that traditional banks and FCS associations each hold about forty percent of farm loans in agriculturally important areas.[14]

84. Yet lenders in the farm credit system do not take deposits and are entirely excluded from deposit-based HHI calculations. FCS loans are generally excluded from loan-based HHI calculations as well because loan data is not available on a market level. The result is systematic and known biases in the HHI in rural areas that can vastly overstate the potential for adverse competitive effects post-merger.

85. If actual market-specific FCS loan data is available, use it. If not, the aforementioned Kansas City Fed article provides a possible estimation method. No single method is perfect, but the underlying principle is that the resulting HHIs should be free of systematic and known biases. The default assumption that the market shares of FCS association loans is exactly zero creates a systematic and known bias and is not defensible.

86. One last small point on this question highlights a deeper issue. FCS loans should be not called a "mitigating" factor. If FCS loans are properly taken into account, they will become an integral part of the product and geographic market definition exercise and recognized as the significant competitive constraint on banks that they are in rural areas. The HHI will account for them. "Mitigating" factors should refer to

[14] Morris *et al.*, *supra* note 1.

factors that are relevant for evaluating competitive effects but not captured in a correctly calculated HHI. Calling FCS associations a mitigating factor is in the mold of the "additional analyses" section of the 1995 BMG and should be avoided.

VII. COMMENTS ON "NON-TRADITIONAL BANKS"

A. Should the Division include non-traditional banks (e.g. online) in its competitive effects?

87. Yes, absolutely. There is no basis for arbitrarily excluding competitors that impose significant competitive constraints on merging banks. The purpose of the market definition exercise is to understand the competitive choices that consumers and businesses have and whether they can defeat any attempted post-merger price increase. Disregarding a vast amount competition creates systematic and known biases in the HHIs and predictable errors in merger analysis.

88. A similar problem occurs with the practice of downweighting credit unions and thrifts to 50%. The reason given by the Fed is that "thrifts typically have not provided a full range of retail banking products and services provided by commercial banks" and that "thrifts have not been active in commercial lending". But there is no economic justification for downweighting or excluding legitimate competition in a properly defined product market. In terms of retail banking products, there are many service providers that compete with banks on only some of the services banks provide but, collectively, they compete with banks on essentially all the services that banks provide. The piece-by-piece dismissal of individual competitors because they are not full service providers is ultimately the wholesale dismissal of full-scale competition that is. In terms of less commercial loan activity, it is straightforward to calculate a loan-based HHI for commercial loans to examine that. The current approach is to make arbitrary adjustments to the wrong metric (deposits) to compensate for a failure to use the right metric (commercial loans) that is of interest. If a credit union or thrift accepts deposits (and does not do nothing with the other 50%) then all those deposits must be included in a deposits-based metric.

B. Does the Division give appropriate weight to online deposits?

89. No. If the Division does not currently give full weight to online deposits in its deposit-based HHI calculations, then it does not give appropriate weight to online deposits.

90. The Fed currently disregards online deposits, as stated in its online FAQ: "Deposits of Internet banks are generally not included in local market share calculations, because it is not possible, given current data, to determine where the depositors of such banks are located." But disregarding these large competitors is not defensible. It is equivalent to assuming their market shares are exactly zero, leading to systematic and known biases in the HHIs and predictable errors in merger analysis.

C. Given that the geographic dispersion of deposits from online banks is not publicly available (by market or branch), suggest how these institutions can be incorporated into screening and competitive effects analysis.

91. There are several methods. No single way is perfect, but the principle is to estimate market shares using the best available information to produce HHIs that are free of systematic and known biases. The current practice of assuming market shares of online banks are exactly zero does not do this.

92. It is straightforward to gather deposit information for online banks on a national level through their SEC 10-K filings. Banking-market-specific market shares can be estimated using this data and one or more estimation methods. One estimation method assumes that online deposits are distributed across regions in the same proportion as deposits of traditional banks. A region that holds 1% of the nation's traditional bank deposits would be estimated to hold approximately 1% of the online bank deposits. This is the most natural and obvious approach, but there are other methods as well. A second estimation method assumes that deposits are distributed proportionately based on population. A region that holds 1% population would hold approximately 1% of online bank deposits. A third estimation method would assume that deposits are distributed proportionately based on income. A region that holds 1% of the nation's income would hold approximately 1% of online bank deposits. A fourth estimation method would assume that deposits are distributed proportionately based on wealth. A region that holds 1% of the nation's wealth would hold

approximately 1% of online bank deposits. The deposit-based estimation is likely to be most informative, since it involves known deposits directly, while the wealth-based estimation is likely to be least informative since wealth distributions are highly skewed and wealthy individuals hold the vast majority of their wealth outside of deposit accounts. It is possible to use a weighted average of several estimates, and the procedure can be fine tuned over time as more information becomes available on how online deposits correlate with traditional deposits, population and income. The estimated market shares for online banks can be made available by the Division. Obviously, if future regulations make market-level deposits available for online bank customers, use them.

VIII. COMMENTS ON "DE MINIMIS EXCEPTION"

A. Should the Division implement an internal *de minimis* exception for very small transactions whereby the Division would automatically provide a report on the competitive factors of the transaction to the responsible banking agency but would not conduct an independent competitive effects analysis of these deals? If so, what would be an appropriate *de minimis* size of transaction?

93. It seems prudent, but applicants in small transactions should still have the option of requesting an independent review from the Division, should there be disagreements with the responsible banking agency in terms of approach. Banking agency guidelines have not always been consistent with the economic principles set out in the 2010 HMG, and this will help ensure the approach of all four agencies are aligned with each other and with the economic principles in the 2010 HMG.

94. Countervailing effects in small transactions in particular must be given careful consideration, as small transactions often hold the greatest potential for post-merger efficiencies, and/or involve small targets that have the highest risks of eventual failure. As the minimum efficient scale in the industry increases, small banks are less well-positioned to meet competitive challenges, offer competitive rates, gain economies of scale, spread out the fixed costs of regulatory compliance, or keep up with the latest

technologies. Such mergers are often the only feasible means to ensure the long run survival of older and smaller community banks.

95. It is inadvisable as a policy matter to wait until a small bank failure is imminent before a merger is allowed when it is clear that a small bank is on a direct path to eventual failure. Enabling efficiency-motivated mergers now leads to stronger and more effective competitors in the marketplace in the long run.

96. I leave it to industry participants to place a figure on the appropriate size of a *de minimis* transaction.

IX. CONCLUSION

97. This concludes my initial response to the request for public comments on banking merger review analysis published by the Division on September 1, 2020. I reserve the right to amend or expand my opinions as new information becomes available and as new issues in the industry arise.

98. Executed in Lubbock, Texas, U.S.A., this day of October 9, 2020.

Dr. Michael D. Noel
Lubbock, TX

EXHIBIT A

The following are examples of significant technological developments, many now taken for granted, that have greatly reduced the need for physical bank branch access:

> Credit Cards. One of the first technologies that significantly reduced branch use since 1963 was the widespread adoption of credit cards. VISA and MasterCard, ubiquitous names today, did not exist in 1963 when the Court published its guidance. According to the Federal Reserve, 74% of transactions in 2018 were non-cash transactions and 31% of those were by credit card.[15] Credit cards are generally issued by mail, carried around by the consumer in a purse or wallet, used online or at the point-of-purchase, and paid either online or by mail. They have significantly reduced cash needs and the need to visit a branch.
>
> Automated Teller Machines (ATMs). ATMs revolutionized the banking industry in the 1980s by making physical cash available 24 hours a day and making it available without having to go into, or near, a branch. ATMs can be found in convenience stores, pharmacies, supermarkets, retail stores, stand-alone kiosks, and at a wide variety of retail establishments. The proliferation of ATMs means that bank branches are no longer necessary to access cash. At the same time, cash use is declining – only 26% of transactions in 2018 were cash transactions, accounting for only about 9% of total transaction value.[16]
>
> Debit Cards. Debit cards have quickly become the most popular payment method, accounting for 28% of all transactions and 38% of all non-cash transactions in 2018.[17] The widespread use of debit cards and credit cards, the ubiquity of ATM networks, and the declining need for cash all combine to substantially reduce the need to go into a physical bank branch for routine tasks today.
>
> Checks. Checks were once the dominant method of non-cash money transfer, but have been largely replaced with direct deposit services, debit cards and credit cards, and other forms of electronic money transfer. Whereas checks once required a trip to the bank, today they can be deposited in ATMs or by uploading pictures of them online, in addition to mail. Retailers that accept checks can now deposit them into their accounts simply by scanning them.
>
> Direct Deposit. Direct deposit is a form of electronic money transfer which substantially reduced the use of paper checks, and the need for bank visits. The vast majority of U.S. employees today use direct deposit to deposit their paychecks. More generally, electronic money transfers through the Automated Clearing House (ACH) network have substantially reduced the need for cash and checks and, thus, the need for branch visits.
>
> Consumer Bill Pay Services. Utility bills and other household bills were historically paid by mail (via check), in person at the provider, or by going to a bank which offered this service. Today, bills are more often paid by credit card, debit card, or through the ACH network without the need for a branch visit. Credit card bills themselves can be paid the same way.

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[15] Federal Reserve Board. "2019 Findings from the Diary of Consumer Payment Choice", June 2019.

[16] Federal Reserve Board. "2019 Findings from the Diary of Consumer Payment Choice", June 2019; Federal Reserve Board. "2015 Findings from the Diary of Consumer Payment Choice", November 2016.

[17] Federal Reserve Board. "2019 Findings from the Diary of Consumer Payment Choice", June 2019;

Online Banking. ***One of the most transformative changes in the banking industry over the past twenty years is the rise of online banking***. Just as credit cards, debit cards, electronic money transfer, ATM networks, and other technologies greatly reduced branch visits for everyday transactions, online banking took care of much of the rest. Consumers can now go online and perform almost any task that required a branch visit twenty years ago (except getting physical cash which is easily done by ATM). The transformation is especially important for geographic market definition because, for many people, it eliminates the "inconvenience of travel" that the Court discussed in 1963. Today, online customers need not travel to banks - the bank travels to them. Regardless of where a customer lives and regardless of where a bank has its physical branches, if it has any branches at all, online banking reaches them.

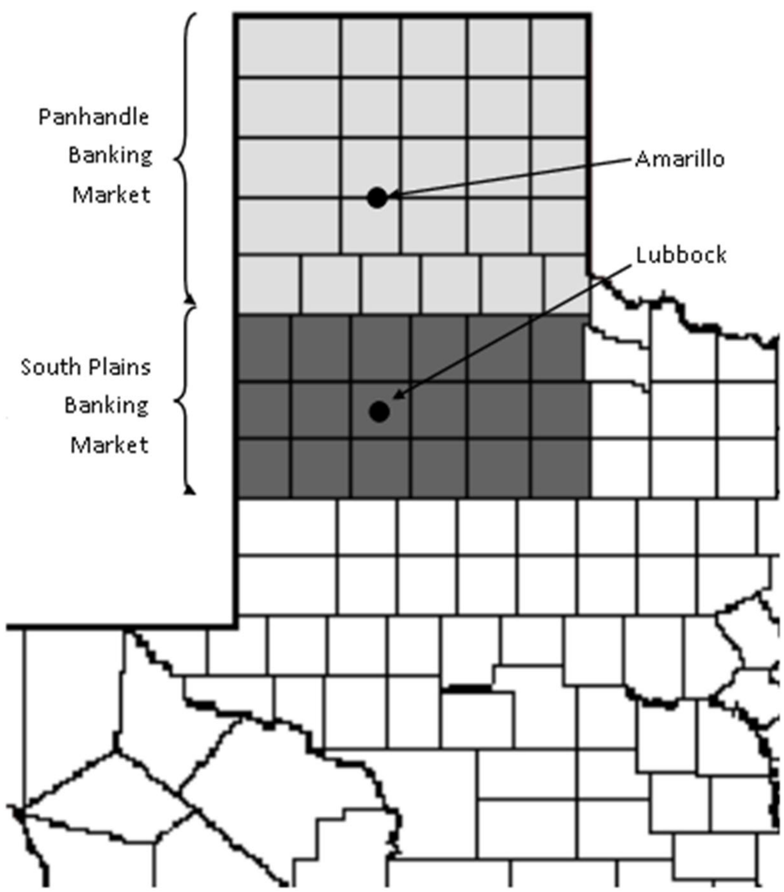
Investments. Setting up and managing investments, such as Certificates of Deposits, Money Market accounts, or even brokerage accounts through a bank's brokerage arm, used to require a branch visit. Today, consumers can shop, buy, renew, close, and essentially do anything else relating to their investments online.

Loans and Mortgages. A visit to a branch was once necessary to apply for a personal or business loan or a mortgage. Some people still prefer to do this, but it is not necessary at most banks. One can apply for loans and mortgages online and pay them online. The largest mortgage lender in the United States, Rocket Mortgage (by Quicken Loans), is an online lender. Kabbage is one of the largest small business lenders. Some lenders do not self-finance but act as intermediaries between businesses and banks regardless of where either is located, entirely eliminating the element of distance between lender and borrower.

EXHIBIT B

A Panhandle Banking Market and a South Plains Banking Market

In Northwest Texas



Curriculum Vitae

Dr. Michael D. Noel
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Department of Economics
Texas Tech University

CONTACT INFORMATION

Michael D. Noel
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EDUCATION

Massachusetts Institute of Technology
Ph.D., Economics, 2002

University of Toronto
M.A., Economics, 1997
Hon. B. Sc., Economics, Statistics & Computer Science, High Distinction, 1996
(Gold Medal Recipient)

EMPLOYMENT

Texas Tech University, Lubbock, TX
Professor, Department of Economics, 2020-present
Associate Professor, Department of Economics, 2013-2020

University of California San Diego, La Jolla, CA
Assistant Professor, Department of Economics, 2002-2011
Visiting Lecturer, Department of Economics, 2012-2013

Edgeworth Economics LLC, Washington, DC, and San Diego, CA
Senior Vice President, 2011-2012

Massachusetts Institute of Technology, Cambridge, MA
Instructor, 1999-2002

University of Toronto, Toronto, ON
Instructor, 1998-2002

MEMBERSHIPS

American Bar Association
American Economics Association
Canadian Bar Association
Econometric Society
Industrial Organization Society
International Association for Energy Economics
Western Economic Association

REFEREED PUBLICATIONS

Noel, Michael D. and Qiang, Hongjie (2019). "The Role of Information in Retail Gasoline Price Dispersion", *Energy Economics* 80, pp. 173-187.

Noel, Michael D. (2018). "Gasoline Price Dispersion and Consumer Search: Evidence from a Natural Experiment", *Journal of Industrial Economics* 66:3, pp. 701-738.

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Noel, Michael D. and Normann, Parker. (2012). “Market Definition Does Not Yield Evidence of Class-Wide Impact”, *The Antitrust Practitioner*, Vol. 9, June 2012, pp. 14-18.

Lewis, Matthew S. and Noel, Michael D. (2011). “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”, *Review of Economics and Statistics*, 93:2, pp. 672-682.

Noel, Michael D. (2011). “Upward Price Pressure, Merger Simulation and Merger Simulation Light”, *CPI Antitrust Chronicle*, Spring 2011 3:1.

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Conference Proceedings and Other Publications

Noel, Michael D. (2013). "Pricing Patterns and Behaviors that Cause Litigation Risks", 2013 Petroleum Marketing Attorneys' Meeting Proceedings, Washington, DC.

Basker, Emek and Noel, Michael D. (2013) "Regional Competition Center for Latin America Presents: Competition Challenges in the Supermarket Sector", Overview Article, CPI Policy International Newsletter.

Noel, Michael D. (2012). "Excessive Volatility in Gasoline Prices? Economic Research Shows that Many Price Spikes and Other Patterns, Often the Subject of Antitrust Concern, Are in Fact Consistent with Competition", *American Bar Association, Section of Antitrust Law, Transportation and Energy Committee Newsletter*, Spring 2012.

Noel, Michael D. (2012). "Blowing Up the Rockets and Feathers Conspiracy", *Law360 (Competition Law and Energy Law)*, online, January 19, 2012.

Noel, Michael D. (2011). "The Promise of Unconventional Oil", *Oil & Gas Monitor*, online, December 19, 2011.

Noel, Michael D. (2005). "Is the City's Recently Passed Gas-Gouging Bill Responsible Public Policy?", San Diego Daily Transcript, San Diego: September 14, 2005, p. A9.

Working Papers and Works in Progress

Noel, Michael D. (2020). "Competitive Responses in a Devastated Industry: Evidence from Hotels during COVID-19", under review.

Noel, Michael D. and Qiang, Hongjie (2020). "Open Price Contracts, Locked-in Buyers, and Opportunism", under review.

Ahundjanov, Behzod and Noel, Michael D. (2020). "What's in a Name? The Incidence of Gasoline Excise Taxes versus Gasoline Carbon Levies", under review.

Noel, Michael D. and Roach, Travis (2020). "Accounting for Aversion: Costs of the Renewable Fuel Standard After Reaching the Blend Wall", under review.

Noel, Michael D. "Why Loyalty Programs Need to Matter in Merger Review", in progress.

Noel, Michael D. and Roach, Travis. "The Risk of Raising Prices First", in progress.

Noel, Michael D. and Qiang, Hongjie. "Information, Search, and Price Dispersion: Lessons from Gasoline Signboards", in progress.

SELECTED CITATIONS

The Supreme Court of the United States, U.S. district and appeals courts.

National competition authorities (e.g. the Federal Trade Commission (U.S.), Canadian Competition Bureau (Canada), Australian Competition and Consumer Commission (Australia), Bundeskartellamt (Germany), Comision Nacional de los Mercados y la (Spain), Konkurrensverket (Sweden)).

Other governmental organizations (e.g. Bureau of Labor Statistics (BLS), Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), Centers for Disease Control and Prevention (CDC), Organisation for Economic Cooperation and Development (OECD)).

Researchers in the United States, Australia, Austria, Anguilla, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Iran, Israel, Italy, Japan, Kuwait, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, Romania, Russia, Singapore, Slovenia, Spain, South Africa, South Korea, Sweden, Switzerland, Thailand, Turkey, Uganda, United Arab Emirates, United Kingdom, Uruguay, Venezuela.

TEACHING

Texas Tech University Courses:

- Industrial Organization Theory (Graduate Level)
- Seminar in Empirical Industrial Organization (Graduate Level)
- Industrial Organization and Competitive Strategy
- Antitrust Law and Economic Regulation
- Special Topics in Applied Economics

University of California San Diego Courses:

- Industrial Organization (Graduate Level)
- Industrial Organization and Firm Strategy
- Regulation and Antitrust
- Game Theory
- Landmark Antitrust Cases in the U.S.

Microeconomics - Consumer Theory
Microeconomics - Cost and Competition Theory
Microeconomics - Monopoly and Oligopoly Theory
How to Take Risks
Management Science Microeconomics
Management Economics (MBA Level)

Massachusetts Institute of Technology Courses:
Microeconomics

University of Toronto Courses:
Industrial Organization and Public Policy
Intermediate Microeconomic Theory
Intermediate Microeconomic Theory (Quantitative Version)
Advanced Economic Theory - Microeconomics

Central South University Courses:
Advanced Industrial Organization

PRESENTATIONS

Central South University, Department of Economics, Changsha, China, 2020. "Gasoline Price Dispersion and Search: Evidence from a Natural Experiment". (Online due to COVID-19).

International Industrial Organization Conference, Philadelphia, PA, 2020. "Open Price Contracts, Locked-in Consumers, and Opportunism". (In-person cancelled due to COVID-19).

Western Economic Association International Conference, Shanghai, China, 2020. "Open Price Contracts, Locked-in Consumers, and Opportunism". (In-person cancelled due to COVID-19).

Western Economic Association International Conference, Tokyo, Japan, 2019. "Gasoline Price Dispersion and Search: Evidence from a Natural Experiment".

Western Economic Association International Conference, Tokyo, Japan, 2019. "The Role of Information in Retail Gasoline Price Dispersion".

University of Oklahoma Department of Economics, 2018. "Gasoline Price Dispersion and Search: Evidence from a Natural Experiment".

Oklahoma State University Spears School of Business, 2018. "Gasoline Price Dispersion and Search: Evidence from a Natural Experiment".

Tulsa University Department of Economics, 2018. "Gasoline Price Dispersion and Search: Evidence from a Natural Experiment".

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Econometric Society Africa Conference, Algiers, Algeria, 2017. “Gasoline Price Dispersion and Search: Evidence from a Natural Experiment”.

University of Dusseldorf DICE Institute, Germany, 2017. “Gasoline Price Dispersion and Search: Evidence from a Natural Experiment”.

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Energy and Environmental Conference, Dubai, United Arab Emirates, 2017. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

American University in Dubai, UAE, 2017. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

Energy and Environmental Conference, Dubai, United Arab Emirates, 2017. “Marginal Reductions in Vehicle Emissions Under a Dual-Blend Ethanol Mandate: Evidence from a Natural Experiment”.

American University in Dubai, UAE, 2017. “Marginal Reductions in Vehicle Emissions Under a Dual-Blend Ethanol Mandate: Evidence from a Natural Experiment”.

University of Dusseldorf DICE Institute, Germany, 2017. “Competition and Pricing in Retail Gasoline Markets”.

University of Dusseldorf DICE Institute, Germany, 2017. “Calendar Synchronization of Gasoline Prices”.

Universidad Dinamica das Cataratas, Foz do Iguacu, Brazil, 2016. “Marginal Reductions in Vehicle Emissions Under a Dual-Blend Ethanol Mandate: Evidence from a Natural Experiment”.

Universidad Dinamica das Cataratas, Foz do Iguacu, Brazil, 2016. “Language, Education, and Mobility”

Universidad Dinamica das Cataratas, Foz do Iguacu, Brazil, 2016. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

International Association for Energy Economics Conference, Perth, Australia, 2016. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

CAED Conference, Istanbul, Turkey, 2015. “Do Edgeworth Price Cycles Lead to Higher or Lower Prices?”

National Association of Energy Service Companies Conference, New Orleans, LA, 2015. “Are We Finally on the Glide Path to a Robust Economy?”

International Industrial Organization Conference, Boston, MA, 2015. “Forecasting Gasoline Prices in the Presence of Edgeworth Price Cycles”.

Texas Tech University Economics Department, 2015. “Forecasting Gasoline Prices in the Presence of Edgeworth Price Cycles”.

Catholic University of Argentina, Rosario, Argentina, 2014. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

University of Texas at Austin Department of Economics, 2014. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

International Industrial Organization Conference, Chicago, IL, 2014. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

Texas Tech University, 2014. “Regulated and Unregulated Substitutes: Aversion Effects from an Ethanol Mandate”.

American Bar Association, Section of Environment, Energy, and Resources, Petroleum Marketing Meeting, Washington D.C., 2013. “Pricing Patterns and Behaviors in Gasoline that Cause Litigation Risks”.

University of North Dakota Economics Department, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

Rice University Economics Department, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

Texas Tech University Economics Department, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

University of South Alabama School of Business, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

University of Nebraska Economics Department, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

University of South Florida Economics Department, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

California State University East Bay Economics Department, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

University of Texas at Dallas Jindal School of Business, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

University of Haifa Economics Department, Israel, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

Renmin University Business School, China, 2013. “Edgeworth Price Cycles and Intertemporal Price Discrimination”.

University of North Dakota Economics Department, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Rice University Economics Department, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Texas Tech University Economics Department, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of South Alabama School of Business, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of Nebraska Economics Department, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of South Florida Economics Department, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

California State University East Bay Economics Department, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of Texas at Dallas Jindal School of Business, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of Haifa Economics Department, Israel, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Renmin University Business School, China, 2013. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

American Bar Association, Section of Antitrust Law seminar series, hosted by Hunton & Williams LLP, Washington, DC, 2012, and broadcast nationally by phone and web. Discussion based on article “Excessive Volatility in Gasoline Prices? Economic Research Shows that Many Price Spikes and Other Patterns, Often the Subject of Antitrust Concern, Are in Fact Consistent with Competition”. “Rockets and Feathers: Are Oil and Gas Price Spikes Actually Pro-Competitive?”

Canadian Bar Association Annual Meeting, Gatineau, QC, Canada, 2012. “Comments on the 2012 Canadian Abuse of Dominance Guidelines”.

National Association of Energy Service Companies Conference, San Diego, CA, 2011. “It's Still the Economy: Have We Turned a Corner?”

Freehills Law Firm, Sydney, Australia, 2011. “Upward Price Pressure, Merger Simulation and Merger Simulation Light”.

University of Sydney Economics Department, Australia, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Peking University HSBC Business School, China, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Shanghai University School of Finance and Economics, China, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Waikato University Economics Department, New Zealand, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Monash University Economics Department, Australia, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

SUNY Stony Brook Economics Department, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Wilfred Laurier University Economics Department, Canada, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of Delaware Economics Department, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

College of William and Mary Economics Department, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of Alabama Economics Department, 2011. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Purdue University Economics Department, 2010. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Econometric Society Africa Conference, Cairo, Egypt, 2010. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Industrial Organization Society Conference, Vancouver, Canada, 2010. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

GCBE Conference, Rome, Italy 2010. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

Texas A&M University Economics Department, 2010. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of Waterloo Economics Department, Canada, 2010. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

University of British Columbia Sauder School of Business, Canada, 2010. “The Speed of Gasoline Price Response in Markets with and without Edgeworth Cycles”.

GCBE Conference, Rome, Italy, 2010. “Edgeworth Price Cycles, Competition and Antitrust”.

University of California Energy Institute POWER Conference, Berkeley, CA, 2009. “Comments on Price Leadership and Coordination”.

Conference on Empirical Legal Studies, University of Southern California Law School, 2009“. Comments on Patent Rights and Economic Growth”.

Yale University Economics Department, 2008. “The Evolving Food Chain: Competitive Effects of Wal-Mart’s Entry into the Supermarket Industry”.

Comparative Analysis of Enterprise Data Conference, Budapest, Hungary, 2008. “Strategic Patenting and Software Innovation”.

International Industrial Organization Conference, Savannah, GA, 2007. “The Evolving Food Chain: Competitive Effects of Wal-Mart’s Entry into the Supermarket Industry”.

Toulouse Conference on the Software and Internet Industries, Toulouse, France, 2007. “Strategic Patenting and Software Innovation”.

University of California Davis Economics Department, 2007. “Do Gasoline Prices Respond Asymmetrically to Cost Shocks? The Effect of Edgeworth Cycles”.

International Industrial Organization Conference, Savannah, GA, 2007. “Do Gasoline Prices Respond Asymmetrically to Cost Shocks? The Effect of Edgeworth Cycles” .

University of California San Diego, Dean's Policy Luncheon, 2006. “Gasoline Prices: Why are Canada and the U.S. Different?”

University of California Energy Institute Oil and Gas Conference, Berkeley, CA, 2006. “Comments on Atkinson and Hoskin”.

LECG Conference on Software Patents, Cambridge, MA, 2005. “Strategic Patenting and Software Innovation”.

University of California San Diego Economics Department, 2005. “Do Gasoline Prices Respond Asymmetrically to Cost Shocks? The Effect of Edgeworth Cycles”

International Industrial Organization Conference, Atlanta, GA, 2005. “Edgeworth Cycles and Focal Prices: Computational Dynamic Markov Equilibria”.

Massachusetts Institute of Technology Economics Department, 2004. “Strategic Patenting and Software Innovation”.

LECG Conference on Software Patents, Cambridge, MA, 2004. “Strategic Patenting and Software Innovation”.

University of Oregon Economics Department, 2003. “Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets”.

University of Oregon Economics Department, 2003. “Edgeworth Price Cycles: Evidence from the Toronto Retail Gasoline Market”.

University of California San Diego Economics Department, 2002. “Edgeworth Cycles and Focal Prices: Computational Dynamic Markov Equilibria”.

Bates White, Washington, DC, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

Clemson University Economics Department, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

Charles River Associates, Boston, MA, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

Duke University Economics Department, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

Massachusetts Institute of Technology Economics Department, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

Northwestern University Economics Department, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

Stanford University Graduate School of Business, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

University of California Berkeley Haas School of Business, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

University of California San Diego Economics Department, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

University of Chicago Graduate School of Business, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

University of Michigan Economics Department, 2002. "Edgeworth Price Cycles, Cost-based Pricing, and Sticky Pricing in Retail Gasoline Markets".

Bates White, Washington, DC, 2002. "Edgeworth Price Cycles: Evidence from the Toronto Retail Gasoline Market".

Clemson University Economics Department, 2002. "Edgeworth Price Cycles: Evidence from the Toronto Retail Gasoline Market".

Charles River Associates, Boston, MA, 2002. "Edgeworth Price Cycles: Evidence from the Toronto Retail Gasoline Market".

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University of Michigan Economics Department, 2002. “Edgeworth Price Cycles: Evidence from the Toronto Retail Gasoline Market”.

Referee Service

American Economic Review
American Economic Journal
American Journal of Agricultural Economics
Addison-Wesley Publishing Economics Group
Antitrust Law Journal
Applied Economics
B.E. Journal in Theoretical Economics
B.E. Journal of Economic Analysis and Policy
Canadian Journal of Economics
Canadian Public Policy
Contemporary Economic Policy
Economic Inquiry
Economic Journal
Economic Record
Economics Bulletin
Energy Economics
Energy Journal
Energy Policy
Food and Agricultural Economics
International Journal of Industrial Organization
International Journal of the Economics of Business
Journal of Competition Law and Economics
Journal of Economic Behavior and Organization
Journal of Economic Surveys
Journal of Economic Theory

Journal of Economics
Journal of Economics and Management Strategy
Journal of Environmental Management
Journal of Industry Competition and Trade
Journal of Industrial Economics
Journal of Law, Economics, and Organization
Journal of Law and Economics
Journal of Political Economy
Journal of Regulatory Economics
Management Science
Managerial and Decision Economics
Marketing Science
National Science Foundation
Oxford Bulletin of Economics and Statistics
Public Library of Science One
RAND Journal of Economics
Review of Economics and Statistics
Review of Industrial Organization
Review of Network Economics
Russian Journal of Economics
Scandinavian Journal of Economics
Science
Social Sciences and Humanities Research Council of Canada
Southern Economic Journal
Transportation Research Part A: Policy and Practice
Transportation Research Part D: Transport and Environment
University of California Energy Institute CES Program
University of California Energy Institute EST Program
Wiley-Blackwell Publishing Economics Books

PRESS INTERVIEWS, QUOTES, AND RESEARCH PROFILES

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and unemployment. August 13, 2020

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and unemployment. July 30, 2020

Spectrum Evening News, Austin. Interview on unemployment insurance extension. July 24, 2020

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and unemployment. July 9, 2020

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and unemployment. June 25, 2020

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and economic reopening. June 4, 2020.

WalletHub. “States hit most by unemployment claims”. May 28, 2020.

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and economic reopening. May 21, 2020.

CTFN. “Legal Issues Plague North American Pipelines”. May 19, 2020.

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and economic reopening. April 30, 2020.

Spectrum News, Austin. “Texas jobless claims increase by another 254,000”. April 30, 2020.

Daily Toreador. “Unemployment rates, economy impacted by Covid-19”. April 28, 2020.

Spectrum News, Austin: “Capital Tonight” news program. Interview on coronavirus and a potential economic reopening. April 17, 2020.

Spectrum News, Austin. “Texas jobless claims climb to more than 1 million since stay-at-home orders issued”. April 17, 2020.

Sinclair Broadcasting Group (and ~ 190+ ABC, CBS, NBC, Fox, and CW station websites). “Stock market takes record fall despite emergency Fed rate cuts”. March 16, 2020.

KLBK Television (CBS Lubbock). “Economics professor says the coronavirus is affecting economy”. March 11, 2020.

KLBK Television (CBS Lubbock). Interview on coronavirus and gasoline prices. March 11, 2020.

Daily Toreador. “Low gas prices caused by supply and demand”. March 11, 2020.

KJTV Television (FOX Lubbock). “Coronavirus, oil pricing war driving unstable stock market”. March 10, 2020.

KJTV Television (FOX Lubbock). Interview on economic effects of coronavirus and oil price collapse. March 10, 2020.

KJTV Television (FOX Lubbock). Interview on coronavirus and oil price war. March 9, 2020.

KCBD Television (NBC Lubbock). Interview on Saudi refinery attack. September 18, 2019.

KCBD Television (NBC Lubbock). “Attacks in Saudi Arabia raising West Texas gas prices”. September 18, 2019.

KJTV Television (FOX Lubbock). Interview on Saudi refinery attack. September 17, 2019.

KJTV Television (FOX Lubbock). “International dispute could cause gas prices to spike in West Texas”. September 17, 2019.

Daily Toreador. “Faculty discuss labor day, hurricane effects on gasoline prices”. September 1, 2019.

Anchorage Daily News. “How experts say BP and Hilcorp’s blockbuster deal in Alaska could help them both”. August 29, 2019.

Associated Press. “BP to shed Alaska assets, sell to Hilcorp Alaska for $5.6B”. August 27, 2019. Also printed in: US News, MSN Money, Washington Post, Houston Chronicle, San Francisco Chronicle, Detroit News, San Antonio Express-News, CTV (Canada) News, Seattle Times, Minneapolis Star-Tribune, Miami Herald, Toronto Star, ABC Go, Yahoo News, and several hundred other media outlets.

KJTV Television (FOX Lubbock). Interview on U.S.-Mexico trade deal. August 27, 2018.

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Texas Tribune. “Texas oil industry experts say Mexico’s plan to halt fuel imports won’t have immediate impacts”. August 14, 2018.

Dallas Business News. “Analysts divided on whether AT&T will prevail in appeal in merger case”. July 13, 2018.

Los Angeles Times. “When companies say a merger will result in lower prices, try laughing in their face”. July 10, 2018.

US News and World Report. “Are Mergers Good or Bad for Consumers?” June 5, 2018.

Daily Toreador. “Professor: Trump’s Tariff Plan May Not Help Job Growth”. March 27, 2018.

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KJTV Television (FOX Lubbock). “Gas Prices Continue to Rise”. December 26, 2016.

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Grants and Awards

Texas Tech Faculty Research Grant, 2013
World Bank / Regional Competition Center for Latin America Grant, 2012
LECG Research Grant, Platform Economics, 2006
LECG Research Grant, Software Economics, 2005

COR Research Grant, UCSD, 2004
UCSD Faculty Research Grant, 2002
MIT Schultz Research Grant, 2000
Social Sciences and Humanities Council of Canada Fellowship, 1998-2000
MIT Doctoral Fellowship, 1997-1998
Mary H. Beatty Fellowship, U. of Toronto, 1997
Junior Fellow, Massey College, U. of Toronto, 1997
Ontario Graduate Scholarship, 1996 &1997
Lorne T. Morgan Gold Medal in Economics, U. of Toronto, 1996
Faculty Scholar, U. of Toronto, 1993-1996
U. of Toronto Scholarship, 1996
U. of Toronto Open Fellowship, 1996
Innis Anniversary Scholarship, U. of Toronto, 1995
Winifred Florence Hughes Scholarship, U. of Toronto, 1994
Rhea A. Scott Scholarship, U of Toronto, 1993

STUDENT ADVISING

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Azadeh Jalali, TTU Ph.D. (2017, University of Kansas)
Najmeh Kamyabi, TTU Ph.D. (2017), Boise State University
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Alexander Sawyer, UCSD Ph.D. (2010), Chapman University
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Chao Cong, UCSD M.A. (2006), Washington Mutual
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