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**Article**

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## Deficiency Judgments as a Mortgage Pricing Factor

### Abstract

The subject of the deficiency judgments has been poorly examined due to a lack of relevant data and the complexity of the issue. Some comprehensive studies have explored whether allowing deficiency judgments decreases the likelihood of strategic defaults in the U.S. mortgage market. Little, however, has been done to determine whether there is any direct correlation between legal standing allowing recourse and loan pricing. Hence, additional work regarding this subject is needed.

This study seeks to fill this gap by exploring the impact of allowing deficiency judgments on mortgage pricing policy in various U.S. states. Seven distinctive mortgage types in two groups of states were compared. We conclude that there is no statistically significant difference between recourse and non-recourse states in terms of mortgage pricing, regardless of mortgage type.

**Keywords:** deficiency judgment, recourse and non-recourse mortgages, mortgage pricing policies

**JEL:** G21, G28, K25, K35

### Introduction

A set number of factors determining the likelihood of default and foreclosure emerge from empirical research and theoretical analysis. Primary among them are deficiency

judgments, equity of redemption, the statutory right of redemption and judicial/ non-judicial foreclosures [Clauretie, Herzog, 1989, pp. 221–233], as well as bankruptcy laws. In this study we differentiated between states in which the mortgage holders can file for a deficiency judgment if the proceeds from a foreclosure sale are insufficient to cover their mortgage debt, and states in which lenders are prohibited or severely restricted from pursuing the borrower. Based on the foregoing dichotomy, we analyzed whether there are risk assessment differences between these two groups of states and, consequently, more (less) stringent pricing policies in states considered non-recourse (recourse). Mortgage interest rates stem from interbank offer rates and assessments of default risk. Lenders have little direct influence on the former. Therefore, the latter should pre-eminently differentiate pricing policies among lenders. Since mortgages are long-term obligations, interest rate surges increase clients' likelihood of default. And property price declines reduce the ability of borrowers' to refinance. This is especially true in the U.S. market where, unlike in Europe, interest rates are usually fixed either for the whole term of the mortgage or for the first few years (FRM, 5/1 ARM, 7/1 ARM).

The mortgage market in the U.S. – as opposed to Europe – is often perceived as recourse, because most states allow deficiency judgments. Among recourse states, 21 have no limits and 27 impose restrictions. A deficiency judgment usually refers to a lender's claim for the difference between a property's value at the time of foreclosure and the outstanding loan balance, accrued interest, and legal and other costs acquired in the course of the procedure following default. It is believed that the single most important reason for default is the borrower's financial situation deterioration. This reason has been the most common explanation for rising foreclosures in the Great Recession.

In that financial shock, negative equity has been viewed as a collateral consequence of severe real estate depreciation, rather than a potential risk factor for mortgage default. The literature often portrays a mortgage as a type of financial asset [Kau et al., 1993, pp. 288–299]. As such, it is a tool determining credit risk. Option-pricing modeling is usually applied to assess the likelihood that a particular borrower will default, and includes deficiency judgments as a factor in exercising that option [Johnes, 1993, pp. 115–138]. This approach implies that a borrower will default only when the option is in-the-money, meaning that discounted peculiar proceeds and non-peculiar gains combined exceed the costs incurred and discounted potential loss. In other words, intrinsic value should not be less than zero to trigger default on any given mortgage loan. Regardless of how controversial this line of reasoning is, it is more appropriate in a non-recourse state where future cash flows resulting from default are more predictable for a borrower who considers whether to stop loan payments. Applying this model in a recourse state – where neither the scope nor the timing of a mortgagee action can be accurately foreseen – requires a more elaborate methodology.

Though mortgage defaults usually emanate directly from borrowers' financial problems, some people default even when they are capable of paying monthly installments. These

borrowers are referred to as strategic defaulters. Several researchers believe that there is a cause and effect relationship between deficiency judgment availability and strategic default prevalence in any given state. That is, this type of default is higher in non-recourse states than in recourse states. There is little consensus about whether deficiency judgment availability has any direct impact on strategic default rates. This is partially due to a shortage of empirical evidence driven by lack of data availability which, when it exists at all is usually proprietary and therefore unavailable to researchers. In addition, classification factors are ambiguous; there is no single, generally accepted definition of strategic default due to the lack of standardized databases. Rather, inconsistent, erratic definitions complicate matching the data that is available to researchers. Consequently, a reliable comparison between studies is challenging. Conflicting results are also attributable to a variety of factors relevant to the default risk assessment process, such as vintage and geographical location [Experian and Oliver Wyman, 2010, pp. 4–6], volume [Ghent, Kudlyak, 2011, pp. 3139–3186], whether the mortgage is a first or second lien [Jagtiani, Lang, 2011, pp. 7–23], and morality [Guiso et al., 2013, pp. 1473–1515 and Guiso et al., 2009, pp. 1–33] and [White, 2010a, pp. 1–12] and [White, 2010b, p. 971] and [Bridgeman, 2011, pp. 123–153]. A few studies referring to behavioral theories have tackled these problems [Wilkinson-Ryan, 2011, pp. 1547–1583 and Riddiough, Wyatt, 1994, pp. 299–318]. Most of these studies compare U.S. states where, by law or legal custom, different remedies are available to pursue a borrower for the debt owed. No static model can explain the examined question for the reasons mentioned above. However we attempt to determine the impact of particular legal regulations on economics through behavioral channels.

This paper consists of literature review concerning deficiency judgments as a factor affecting strategic default, followed by a statistical analysis of whether lack of recourse is priced into mortgage loans. A discussion of our findings is then provided and followed by final remarks.

## Literature Review

The findings presented in the literature are far from conclusive. Researchers are divided evenly between those convinced that recourse has a significant role in preventing strategic default and those that see no evidence confirming any causal relationship. Data drive the disagreement among researchers, as there is still no comprehensive data source or unambiguous definition of a strategic default. One of the more comprehensive studies is based on proprietary data from LPS Applied Analytics, Ghent et al. [Ghent, Kudlyak, 2011, 2011, pp. 3139–3186], which found that recourse has no direct implication, in absolute terms, on default rates in recourse versus non-recourse states, but it does help to lower borrower sensitivity to negative equity. Moreover, that study suggests that this relationship is strengthened for properties appraised at \$ 500,000 to \$ 750,000,

for which owner, borrowers are twice as likely to default in recourse states. A study by Market Intelligence Report supports this observation [Experian, Wyman, 2010, pp. 8–18]. The advantage of this report is an unrestrained access to mortgage and non-mortgage data obligations assigned to particular borrowers (provided by Experian), which permits calculation and statistical analysis based on a specific, arbitrary definition of a strategic defaulter. Specifically, mortgage and non-mortgage obligations were coupled and strategic defaulters defined as a customers with 60 to 180 or more days past due on their mortgage, with no arrears regarding other types of financial commitments (e.g., less than sixty days past due on auto loans, less than ninety days past due on bank cards, retail cards, and personal loans, and being current on other financial commitments – as verified for the six month period after the first sixty days past due on the mortgage). The report concludes that borrowers with one mortgage are the most likely to walk away from their home despite having financial resources to continue monthly payments. The authors also find that strategic default was the prevailing form of default among sub-prime borrowers. Geographical patterns also emerge from the report. Between 2005 and July 2009 defaults increased eighty and fifty-three times in California and Florida respectively. The timing between borrowing and defaults is also noteworthy: strategic defaulters in the first half of 2009 were six times more likely to have obtained their mortgages in 2006 as compared to those with mortgages originating in 2004.

These claims have been repeatedly challenged. Due to the fact that other states have been consistently keeping the status of recourse/non-recourse policy, Li and Oswald focused on Nevada, which ended recourse judgments in 2009 (mortgage loans made after October 2009 were collateralized by primary single family homes) [Li, Oswald, 2014, pp. 2–23]. Using unique mortgage loan data, the authors claim that this change did not decrease defaults or foreclosures, and that mortgage demand remained stable despite stricter underwriting processes (lenders reduced approval rates and loan size).

A different perspective emerges from a more general study by Kanis Saengchote [Saengchote, 2014, pp. 2–28] pertaining to all U.S. states. The author uses the BAPCPA (Bankruptcy Abuse Prevention and Protection Act of 2005) as a proxy for states that permits recourse judgment. Although both papers have a similar starting point, their conclusions differ. Saengchote finds that stronger recourse laws may deter strategic defaulters, and significantly increase credit supply in recourse states after BAPCPA. This is considered a consequence of perceiving mortgage collateral as a factor reducing risk as bankruptcy law become strengthened, and therefore the number of eligible borrowers is reduced. He also finds a relationship with the underwriting process.

Hatchondo, Martines and Sanchez constructed a model to try to determine how recourse mortgages and LTV limit regulations can be used to mitigate default risk [Hatchondo et al., 2014, pp. 10–48]. Their study concluded that regulation being too lax or too harsh may inflict harm to the property market. Lenders deprived of primary recourse remedies may seek more defaults. Overly stringent regulations may decrease housing demand

and diminish a household's ability to provide self-insurance for themselves. The authors claim that these adverse results may be mitigated by combining relatively mild recourse laws with Loan-to-Value limits, which could lower default rates and strengthen demand without impairing a home buyers ability to cover the risk using self-insurance. Another study focusing on the relationship between recourse and non-recourse states [Bhutta et al., 2010, pp. 14–29] seeks to investigate the underlying cause of mortgage defaults in Arizona, California, Florida and Nevada (covering non-prime mortgages in the period between 2006 and September 2009). Their findings suggest that – depending on the negative equity threshold – both the “double trigger” and “strategic default” theories are correct. The “double trigger” theory states that life events and liquidity constraints, along with “ruthless calculation” may trigger a decision to default on an “underwater” mortgage. “Strategic default” theory states that rational calculation drives borrowers to default when negative equity is involved. The authors attempt to quantify this threshold, finding that the median borrower refrains from default until negative equity exceeds 62%. On the other hand, when negative equity is 10% or less, the combination of life events and negative equity can trigger delinquent payments.

Literature on what implications lender remedies have on voluntary defaults, and the price implication resulting from different legal rights, are in short supply. The few that have been conducted concentrate more on coinsurance and risk transfer between mortgage holders and insurers, rather than the general costs imposed on a bank or borrower.

Based on quantitative analysis, Ambrose et al. advise private mortgage insurers to increase transaction costs associated with mortgage put option for borrowers. To do so, they recommend shortening the period between default and foreclosure and increasing “in the money” deficiency judgments to decrease strategic defaults, and cut costs. The authors also recommend that governmental insurers (who provide de facto PMI) actively seek deficiency judgments. This recommendation rests on two study findings: (a) default probability increases with the expected delay between default and actual foreclosure and (b) a reverse correlation between likelihood of deficiency judgment and default [Ambrose et al., 1997, pp. 314–325]. These findings are generally corroborated by Jagtiani, Lang [2011, pp. 7–23].

Their study concentrated on factors determining a borrower's propensity to default on a first lien while staying current on a second lien mortgage. The authors revealed several statistically relevant regularities. Among them is that negative equity was a prerequisite for default, but insufficient to trigger it. This explains why there is a significant proportion of borrowers defaulted on their first lien mortgage while remaining current on their second lien mortgage. Borrowers were especially likely to do so when the second lien was a HELOC (home equity line of credit) rather than HELOAN (home equity loan), as the former provided borrowers with a credit line. Surprisingly, though, researchers found no evidence that mortgage quality (prime, alt-A or subprime) played a significant role in determining this behavior.

Perhaps the most perplexing results concerning pricing specifically emerge from a study conducted by [Ghent, Kudlyak, 2011, pp. 3174–3177], indicating that interest rates are actually higher in recourse, versus non-recourse states (excluding privately held mortgages). They also found the strongest deterrent effect for strategic defaulters to be properties appraised at \$ 750.000 to \$ 1.000.000, which may suggest a strong correlation between recourse and pricing within that price category.

## Data and Methodology

One would expect that the correlation between legal standing in a given state and probability of default would impact risk assessment. Therefore that risk, being a crucial pricing element, would be reflected in interest rates. Since most studies ignore the differences between recourse and nonrecourse states, we investigate the issue from a practical perspective. We consider interest rates to be the most adequate determinant of potential price differentiation between states, since interest rates reflect the cost of capital and of risk involved in different types of loans. To determine whether there is a clear relationship, we juxtapose average interest rates across recourse and non-recourse states as determined by Ghent and Kudlyak [Ghent, Kudlyak, 2011, pp. 3143–3146]. We then split the data into seven groups to reflect distinctive types of mortgages (instead of pooling these data together). While this may increase the likelihood of having to choose non-parametric calculation methods due to a more scattered distribution, it enhanced the practical results. Seven types of mortgages were taken into consideration, namely: thirty year –term mortgages with a fixed interest rate (30 year fixed), fifteen year-term mortgages with a fixed interest rate (15 year fixed), hybrid adjustable-rate mortgages (5/1 ARM), thirty year-term refinanced mortgages (30 yr fixed mtg refi), fifteen years-term refinanced mortgages (15 yr fixed mtg refi), hybrid adjustable-rate refinanced mortgage (7/1 ARM refi), and fifteen year-term jumbo refinanced mortgages with fixed interest rates (15 yr jumbo fix mtg refi).

The hybrid adjustable-rate mortgage (5/1 ARM) has a fixed interest rate for 5 years, that is then adjusted annually. From year six onwards, the interest rate is based on an index factor and a predetermined margin. The hybrid adjustable-rate refinanced mortgage (7/1 ARM refi) has the same structure, but it lasts seven years. These mortgage types can be used when the property will likely be sold before the initial fixed payment period.

Adjustable-rate mortgages or ARM are much less popular in the U.S. than in continental Europe. According to 2010 studies by Bankrate, less than 10% of would-be mortgage holders chose this type of mortgage [available at: <http://www.bankrate.com/> accessed: November 8, 2016]. The fifteen year-term jumbo refinanced mortgage with fixed interest rate (15 yr jumbo fix mtg refi) refers to a mortgage exceeding conforming limits imposed by Fannie Mae and Freddie Mac regulations. Cut-off points differ throughout the U.S., but in most states mortgages over \$ 417.000 are qualified as jumbo.



**TABLE 1. States classification of various mortgage types with their average interest rates**

State	Recourse/ non-recourse state	30 year fixed	15 year fixed	5/1 ARM	30 yr fixed mtg refi	15 yr fixed mtg refi	7/1 ARM refi	15 yr jumbo fixed mtg refi
Alabama	recourse	3.45	2.74	3.05	3.49	2.77	3.17	3.14
Alaska	non-recourse	3.44	2.75	3.11	3.56	2.8	3.12	3.18
Arizona	non-recourse	3.5	2.78	3.02	3.53	2.8	3.11	3.91
Arkansas	recourse	3.47	2.75	3.38	3.52	2.79	3.23	3.21
California	non-recourse	3.49	2.76	3.04	3.49	2.76	3.16	4.06
Colorado	recourse	3.44	2.72	3	3.49	2.76	3.12	4.07
Connecticut	recourse	3.47	2.76	2.99	3.48	2.76	3.15	3.14
Delaware	recourse	3.48	2.76	3.04	3.52	2.79	3.17	3.19
Florida	recourse	3.57	2.74	2.99	3.6	2.77	3.16	4.06
Georgia	recourse	3.44	2.73	3.07	3.48	2.76	3.15	3.9
Hawaii	recourse	3.44	2.72	2.99	3.52	2.79	3.22	3.17
Idaho	recourse	3.44	2.71	2.99	3.52	2.74	3.12	3.58
Illinois	recourse	3.46	2.74	3.03	3.5	2.78	3.16	3.16
Indiana	recourse	3.48	2.77	2.91	3.52	2.8	3.19	3.12
Iowa	non-recourse	3.45	2.75	3.11	3.5	2.79	3.19	3.14
Kansas	recourse	3.46	2.75	3.06	3.51	2.79	3.18	3.14
Kentucky	recourse	3.47	2.76	3.13	3.47	2.76	3.09	3.2
Louisiana	recourse	3.46	2.76	3.06	3.51	2.79	3.18	3.13
Maine	recourse	3.46	2.74	3.06	3.5	2.77	3.17	3.17
Maryland	recourse	3.47	2.74	2.95	3.49	2.76	3.13	3.58
Massachusetts	recourse	3.45	2.72	2.86	3.5	2.76	3.16	3.18
Michigan	recourse	3.47	2.75	3.05	3.5	2.78	3.16	3.85
Minnesota	non-recourse	3.46	2.75	3.09	3.51	2.79	3.19	3.2
Mississippi	recourse	3.46	2.76	3.08	3.5	2.79	3.18	3.14
Missouri	recourse	3.46	2.75	3.29	3.51	2.79	3.21	3.18
Montana	non-recourse	3.47	2.76	3.11	3.58	2.8	3.13	3.18
Nebraska	recourse	3.94	2.94	2.94	4.1	3.07	3.39	4.04
Nevada	recourse	3.45	2.74	3.08	3.51	2.78	3.13	3.19
New_Hampshire	recourse	3.46	2.73	3.06	3.51	2.78	3.11	3.18
New_Jersey	recourse	3.45	2.72	2.85	3.48	2.74	3.1	3.33
New_Mexico	recourse	3.45	2.73	2.99	3.5	2.77	3.14	3.38
New_York	recourse	3.5	2.76	2.85	3.55	2.8	3.14	3.61
North_Carolina		3.46	2.76	3.01	3.5	2.79	3.16	3.39



State	Recourse/ non-recourse state	30 year fixed	15 year fixed	5/1 ARM	30 yr fixed mtg refi	15 yr fixed mtg refi	7/1 ARM refi	15 yr jumbo fixed mtg refi
North_Dacota	non-recourse	3.46	2.76	3.1	3.52	2.81	3.13	3.2
Ohio	recourse	3.46	2.75	3.04	3.5	2.78	3.18	3.22
Oklahoma	recourse	3.45	2.75	3.08	3.5	2.79	3.2	3.15
Oregon	non-recourse	3.44	2.71	3.06	3.49	2.75	3.3	4.37
Pennsylvania	recourse	3.43	2.71	2.95	3.46	2.74	3.11	4.09
Rhodejsland	recourse	3.46	2.74	3.03	3.51	2.78	3.1	3.15
South_Carolina	recourse	3.45	2.75	3.02	3.5	2.78	3.16	3.15
South_Dacota	recourse	3.47	2.76	3.14	3.53	2.81	3.13	3.18
Tennessee	recourse	3.44	2.72	2.97	3.48	2.75	3.13	3.2
Texas	recourse	3.46	2.74	2.97	3.49	2.76	3.14	3.92
Utah	recourse	3.45	2.75	3.05	3.49	2.78	3.11	3.89
Vermont	recourse	3.45	2.74	3.1	3.5	2.78	3.18	3.16
Virginia	recourse	3.47	2.75	3.01	3.51	2.78	3.15	3.73
Washington	non-recourse	3.48	2.75	3.02	3.48	2.76	3.12	3.63
West_Wirginia	recourse	3.45	2.74	3.05	3.5	2.78	3.18	3.2
Wisconsin	non-recourse	3.45	2.73	2.84	3.48	2.75	3.11	3.6
Wyoming	recourse	3.47	2.76	3.1	3.54	2.81	3.13	3.31

S o u r c e : own elaboration based on classification determined by Ghent, A.C. and Kudlyak, M., in Recourse and Residential Mortgage Default: Evidence from US States. *The Review of Financial Studies*, 24(9) and average interest rates values provided by Bankrate.com (availablæ at: <http://www.bankrate.com/national-mortgage-rates/>, accessed: November 7, 2016).

## Results

This statistical elaboration compares the means of each type of mortgage interest rate in recourse and non-recourse states. An analysis of histograms revealed that the data under scrutiny did not fulfill the assumptions necessary to apply a parametric test. The assumption was that the data are not normally distributed. Both skewness and kurtosis statistics corroborated this assumption.

Based on histogram inspections, skewness, and kurtosis statistics corroborated by the Kolmogorov-Smirnov test presented below, we determined that assumptions for a t-test are not met and decided to proceed with a non-parametric equivalent.

**TABLE 2. Descriptive statistics**

Mortgage type		Statistic	Std. Error
30 year fixed	Skewness	6.144	0.337
	Kurtosis	40.638	0.662
15 year fixed	Skewness	4.396	0.337
	Kurtosis	26.639	0.662
5/1 ARM	Skewness	0.764	0.337
	Kurtosis	3.471	0.662
30 yr fixed mtg refi	Skewness	6.180	0.337
	Kurtosis	41.277	0.662
15 yr fixed mtg refi	Skewness	5.279	0.337
	Kurtosis	33.725	0.662
7/1 ARM refi	Skewness	2.271	0.337
	Kurtosis	8.117	0.662
15 yr jumbo fixed mtg refi	Skewness	1.052	0.337
	Kurtosis	-0.285	0.662

Source: own elaboration.

**TABLE 3. Kolmogorov-Smirnov test<sup>a</sup>**

Mortgage type	Statistic	df	Sig.
30 year fixed	0.351	50	0.000
15 year fixed	0.296	50	0.000
5/1 ARM	0.137	50	0.020
30 yr fixed mtg refi	0.334	50	0.000
15 yr fixed mtg refi	0.276	50	0.000
7/1 ARM refi	0.158	50	0.003
15 yr jumbo fixed mtg refi	0.298	50	0.000

<sup>a</sup> Lilliefors Significance Correction

Source: own elaboration.

The results of the Kolmogorov-Smirnov tests for each type of mortgage interest rate data distribution permit application of the Mann-Whitney U Test to determine whether there is a statistically significant difference between the median of interest rates in recourse and recourse-states.

TABLE 4. Mann-Whitney U Test<sup>a</sup>

	30 year fixed	15 year fixed	5/1 ARM	30 yr fixed mtg refi	15 yr fixed mtg refi	7/1 ARM refi	15 yr jumbo fixed mtg refi
Mann-Whitney U	181.500	145.500	138.000	183.000	166.000	170.500	146.500
Z	-0.342	-1.253	-1.417	-0.302	-0.730	-0.610	-1.206
Asymp. Sig. (2-tailed)	0.733	0.210	0.157	0.763	0.466	0.542	0.228
Exact Sig. [2*(1-tailed Sig.)]	0.742 <sup>b</sup>	0.223 <sup>b</sup>	0.163 <sup>b</sup>	0.779 <sup>b</sup>	0.485 <sup>b</sup>	0.549 <sup>b</sup>	0.233 <sup>b</sup>

<sup>a</sup> Grouping Variable: Recourse/Non-recourse<sup>b</sup> Not corrected for ties

Source: own elaboration.

TABLE 5. Report on statistics

Recourse/Non-recourse/ Effect size		30 year fixed	15 year fixed	5/1 ARM	30 yr fixed mtg refi	15 yr fixed mtg refi	7/1 ARM refi	15 yr jumbo fixed mtg refi
Non-recourse	N	10	10	10	10	10	10	10
	Median	3.4600	2.7500	3.0750	3.5050	2.7900	3.1300	3.4000
Re-course	N	39	39	39	39	39	39	39
	Median	3.4600	2.7400	3.0400	3.5000	2.7800	3.1600	3.2000
r		0.05	0.18	0.2	0.04	0.1	0.09	0.17

Source: own elaboration.

A Mann-Whitney U Test revealed no significant difference in the 30 years-term mortgage interest rates levels in recourse (Md = 3.46, n = 39) and non-recourse states (Md = 3.46, n = 10), U = 181500, z = -0.342, p = 0.742, r = 0.05.

We found no statistically significant evidence to reject any hypothesis in favor of an alternative. One must conclude, therefore, that there are no grounds to claim the existence of pricing differences (interest rates) resulting from a given state pursuing recourse or non-recourse legislation.

## Conclusion

Counterintuitively and in contrast to various studies suggesting a causal relationship between recourse and default probability – this study shows no statistical evidence to support

a hypothesis claiming a relationship between the availability of deficiency judgments and mortgage pricing in any particular state. None of the seven types of mortgage pricing show any statistically significant relationship with the presence of recourse remedies. This seems to contradict previous studies indicating deficiency judgment availability as a factor of default. There are a few potential explanations for this result. Recourse availability and strategic default with regard to the mortgage market is overestimated. The adverse effects of strategic defaults may be offset by lavish federal programs aimed at affected lenders. The lack of consensus over recourse being an effective deterrent for strategic defaulters may not be a factor in default probability assessment, or (therefore) pricing policy.

At the same time, we recognize that our calculations were based on highly aggregated data for a selected point in time. Thus, further research on disaggregated data is needed to account for the potential influences of other factors. Having said that, this work should be considered an important preliminary exploration that sets the stage for further analysis.

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## Notes

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