

Keynes' Law and its critics

Among the many insights found in the *General Theory*, one of the most useful is the consumption function. Prior to Keynes, consumption had been viewed as a passive residual, the amount of income remaining after saving. In this view, since the decision to save was determined by the payment for the utility lost from consuming, consumption depended on the interest rate. Keynes thought consumption was both more important and more complicated. Since "expenditure creates its own income," consumption fundamentally affects the level of economic activity (Skidelsky, 1997, pp. 311–312). Motives for consumption range far beyond simple sacrifice payments. "There are not many people who will alter their way of living because the rate of interest has fallen from 5 to 4 percent" (Keynes, 1936, p. 94). Spending and saving are influenced by a host of objective attendant circumstance, subjective needs, psychological propensities, and habits (ibid., p. 91). Keynes recognized that people must consume to survive: "for a man's habitual standard of life usually has first claim on his income" (ibid., p. 97). He proposed a "fundamental psychological law" of consumption (ibid., p. 96). A law

upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience, . . . that men are disposed, as a rule and on average, to increase their consumption as their income increases, but not by as much as the increase in their income. That is to say, . . . (paraphrasing) if C is the amount of consumption and Y is income, dC/dY is positive and less than unity.

Because of its novelty, testing of Keynes' Law began almost immediately upon publication of the *General Theory*. The conventional history is that these tests eventually led to the law's rejection because of its inability to reconcile time series and cross-sectional estimates of spending behavior. While Thomas (1989) persuasively shows this "stylized

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history . . . that has become a fashionable feature of many macroeconomic textbooks and survey articles is far from the historical truth,"¹ the conflict motivated reexaminations of the law's theoretical foundations by both Modigliani and Brumberg (1954) and Friedman (1957), which ultimately led to the repudiation of Keynes' formulation. As Modigliani and Brumberg (1954, p. 430) concluded:

The results of our labor basically confirm the propositions put forward by Keynes in *The General Theory*. At the same time, we take some satisfaction in having been able to tie this aspect of his analysis into the mainstream of economic theory by replacing his mysterious psychological law with the principle that men are disposed, as a rule and on average, to be forward-looking animals. We depart from Keynes, however, on his contention of "a greater proportion of income being saved as real income increases" . . . We claim instead that the proportion of income saved is essentially independent of income.

This view had enormous impact. Consumption theories were recast in terms of life cycle responses to expected lifetime or permanent income.² By necessity, they became ones of long run behavior. Responses to current income changes different than long run responses were characterized as transitory and virtually ignored in the theoretical literature. It had important policy implications. Because distributional effects—the original motivation for the first tests of Keynes' Law (Thomas, 1989)—were set by permanent, not transitory influences, "our new understanding of the determinants of saving behavior cast some doubts on the effectiveness of a policy of income redistribution for the purpose of (changing) the average propensity to save" (Modigliani and Brumberg, 1954, p. 431). It challenged both the need and effect of interventionist fiscal policies. Since "current consumption is adapted to some measure of longer-run income status, . . . a much larger part of current income is interpreted as autonomous and a much smaller part as dependent on current income. . . . The result is a smaller investment multiplier, and an inherently cyclically more stable system" (Friedman, 1957, p. 238).

While these conclusions and implications have, in some circles, assumed lawlike qualities themselves, Keynes' Law was never disconfirmed by systematic scientific testing. Instead, its critics derived convincing

¹ In modern form see Mankiw (2000, pp. 434–438). For an older version see Wonnacott (1984, pp. 221–260).

² For a wide-ranging recent survey see Deaton (1992). For earlier surveys, see Evans (1969), Sargent (1979), Bridge (1971), Cramer (1971), and Malinvaud (1970).

and reasonable alternative theories from fundamental microeconomic principles (Thomas, 1989) that became the preferred theories of aggregate spending behavior. The purpose of this paper is to reconsider the arguments and tests used by Modigliani and Brumberg and Friedman to develop their alternatives to Keynes' proposition. As will be seen, individual and average spending behavior were confused, causing incorrect implications to be derived from the consumption function implied by Keynes' Law. The effects of different types of consumer units on estimates of consumption were ignored, again causing confusion about spending behavior. Finally, both developed alternatives to Keynes' Law that focused on the consumption decisions of individuals over their entire economic lives. It is only by heroic assumption that either of these time-series alternatives can explain cross sectional spending behavior at a point in time.

Empirical anomalies

As detailed by Thomas (1989), the "early econometric history of the consumption function" saw efforts to test Keynes' proposed relationship between consumption and income with whatever data was available, using whatever specification seemed reasonable. About half the tests between 1937 and 1940 utilized cross-sectional data. However, reflecting massive improvements in national income accounting methods and data, 20 of 25 studies between 1941 and 1950 used time-series data. Because of the popularity and convenience of this data, results from time-series studies quickly became the standard by which estimates of consumption behavior were judged. But even before World War II problems hinting of later developments appeared. Consumption seemed to depend on the age of the consuming unit, households reacted differently to temporary or transitory income changes than to more permanent ones,³ the intercept of the consumption function seemed to "ratchet" up over time. Later studies, especially those of Kuznets (1942), suggested consumption was a proportion rather than a function of income. After the war, attention increasingly focused on the inability to resolve these problems with a simple linear function.⁴

³ The concepts of "permanent" and "transitory" behavior date at least to Friedman and Kuznets (1945) and probably before World War II.

⁴ There are many reviews and surveys. The standard collection of objections to Keynes' Law is found in Friedman (1957), who also provides a comprehensive review of the empirical testing. For a sampling of other commentaries, all sympathetic to the

Tests of Keynes' Law encountered three basic empirical anomalies.⁵ First, the law could not reconcile estimates of cross-sectional marginal propensities, ranging from 0.4 to 0.8, with time-series estimates clustering around 0.9. Second, the stylistic Keynesian model, $C_t = a + bY_t$, when transformed into an average consumption model, $C_t/Y_t = a/Y_t + b$, predicted a long-run declining spending rate and rising saving rate. That is, increases in Y_t caused a/Y_t to decline and the average propensity to consume should fall. However, it has remained stable since 1900. Third, consumption functions estimated with cross-sectional data showed shifting or ratcheting spending from one dataset or year to another. Such behavior was not found with time-series data and could not be explained.

Fundamental to these anomalies was the implicit assumption that the cross-sectional and time-series tests simply used different types of data to measure the behavior of the same consumer units.⁶ This assumption is incorrect. Cross-sectional data measures the behavior of consumer units⁷ at a point in time while time series data measures the average behavior of all the units through time. In linear form, Keynes' Law was tested as the Keynesian consumption function

$$c_{ti} = a + by_{ti}, \quad (1)$$

for $i = 1, \dots, m$ spending units in time period t with c_{ti} and y_{ti} representing the consumption and income, respectively, of the i th household, and b representing the marginal propensity to consume. The intercept of this equation is calculated by

$$a = \bar{c}_t - b\bar{y}_t, \quad (2)$$

where \bar{c}_t and \bar{y}_t are average or mean consumption and income for year t (e.g., $\bar{c}_t = \sum c_{ti}/m$ and $\bar{y}_t = \sum y_{ti}/m$). When the \bar{c}_t term is multiplied and divided by \bar{y}_t , the intercept becomes

lifecycle/permanent income view, see Bridge (1971, pp. 19–71), Cramer (1971, pp. 171–203), Evans (1969, pp. 13–72), Malinvaud (1970: 115–150), and Sargent (1979, pp. 300–324).

⁵ Friedman's term. For details, see Friedman (1957, pp. 4–5, 44, 224–225). For a later review, focusing on the econometrics, see Thomas (1989).

⁶ If cross-sectional data measures the behavior of one type of spending unit and time-series data measures the behavior of another type, then different empirical estimates of spending behavior should be expected.

⁷ No effort will be made to distinguish different types of behavioral or consumer units. Depending on context or study these could be spending units, households, families, or individuals.

$$a = \beta \bar{y}_t - b \bar{y}_t, \quad (3)$$

where $\beta = \bar{c}_t / \bar{y}_t$, the average propensity to consume in year t . This transformation of the intercept allows Equation (1) to be restated as

$$c_{ti} = (\beta \bar{y}_t - b \bar{y}_t) + b y_{ti}. \quad (4)$$

Since longitudinal data on consumer unit consumption and income do not exist, time series behavior is estimated using average or total data with one data type a linear transformation of the other. When average data is substituted for consumer unit data in Equation (4), the cross-sectional function becomes a proportional time series function⁸

$$\bar{c}_t = \beta \bar{y}_t. \quad (5)$$

Thus, the form of the Keynesian consumption function depends on the consumer unit under consideration. In cross section, where the units are individual households, the existence of an intercept causes consumption to depend on the level of income. However, in time series, where the units represent average behavior, the absence of an intercept means that consumption is proportional to income. This difference in spending units and the related failure to carefully distinguish between cross-sectional and time-series data, explains the conflicting empirical results that perplexed researchers since Keynes proposed his Law.

The first anomaly, that of differing marginal propensities, is explained by the effect of individual and average data in the estimating equation. The second anomaly, that of the alleged predictive failure of the Keynesian consumption function, is again explained by the effect of different types of data. When divided by y_{ti} , the cross sectional shown in Equation (4) becomes

$$c_{ti} / y_{ti} = (\beta \bar{y}_t - b \bar{y}_t) / y_{ti} + b, \quad (6)$$

implying that as household income rises, the average propensity to consume declines and the average propensity to save increases, a result found in every cross-sectional expenditure study (Ferber, 1953; Friedman, 1957). On the other hand, with average data Equation (4) becomes a time series function:

⁸ Since β , the average propensity to consume could vary from year to year, it should be subscripted in t . However, the variance is so slight that it is usually considered constant.

$$\bar{c}_t = (\beta \bar{y}_t - b \bar{y}_t) + b \bar{y}_t, \quad (7)$$

which, when divided through by \bar{y}_t , becomes

$$\bar{c}_t / \bar{y}_t = \beta, \quad (8)$$

implying constant average propensities to consume and save over time, the common result when Friedman wrote. Finally, the third anomaly is explained by the presence of average income in the cross-sectional intercept, $(\beta - b) \bar{y}_t$ with $\beta > b$. As average income increases over time, the intercepts also increase, thereby producing the persistent upward shifting or ratcheting found in the cross-sectional functions.

Empirical tests

To demonstrate "the consistency of the permanent income hypothesis with existing evidence on the relation between consumption and income," Friedman (1957, pp. 38, 115) undertook an extensive review of both cross-sectional and time-series expenditure studies. Of the time-series studies reviewed, the most favorable for his hypothesis covered the longest time period—from 1897 to 1949, excluding 1917, 1918, 1930 through 1933, and 1942 through 1945. Estimated with data compiled by Goldsmith for his "comprehensive study of savings," the regression of real personal consumption expenditures per capita on real personal disposable income per capita produced both marginal and average propensities of 0.91 and an income elasticity of 1.0.⁹

Results from a number of budget or cross-sectional spending studies conducted between 1888 and 1950 collected by Friedman are found in Table 1.¹⁰ While these cover a variety of consumer units and differ somewhat in data collection procedures and variable definitions, nonetheless they show that spending behavior was broadly consistent over the 60-year period surveyed. The overall average propensity is 0.89, ranging from 0.83 to 0.92, and the overall average marginal propensity is 0.69, ranging from 0.57 to 0.79. The income elasticities (η_{cy}) are significantly smaller than those found with time series data with an overall average of 0.78 and individual estimates ranging from 0.65 to 0.87. Finally, intercepts were calculated and shift as average income changes.

⁹ Found at line 4 of Table 12 in Friedman (1957, p. 126).

¹⁰ See Table 1, lines 1 through 11 in Friedman (1957, p. 41).

Table 1
Relation between consumption and income based on cross-sectional data for different dates and groups of consumer units.

Date	Consumer unit	\bar{y}	\bar{c}	a	apc	mpc	τ_{by}
1889-90	Selected wage-earner families	1,236	1,112	284	0.90	0.67	0.74
1901	Selected wage-earner normal families	1,135	1,044	272	0.92	0.68	0.75
1917-19	Selected wage-earner families	1,402	1,276	182	0.91	0.78	0.86
1935-36	Non-relief nonfarm families	1,980	1,762	317	0.89	0.73	0.82
1935-36	Non-relief farm families	1,277	1,111	383	0.87	0.57	0.65
1941	Farm families	1,597	1,325	415	0.83	0.57	0.69
1941	Urban families	2,723	2,505	354	0.92	0.79	0.87
1944	Urban families	2,714	2,225	679	0.82	0.57	0.70
1947	Urban families	2,082	1,915	291	0.92	0.78	0.85
1950	Nonfarm families	2,376	2,162	428	0.91	0.73	0.80
1950	One or more persons, urban + rural	1,873	1,723	318	0.92	0.75	0.82
	Average	1,854	1,651	357	0.89	0.69	0.78

In reviewing the estimates found in Table 1, Friedman (1957, p. 44) concluded that the cross-sectional elasticities make

it impossible to regard these regressions as estimates of a stable relation between consumption and income. An income elasticity of less than unity implies that a rise in income produces a decline in the ratio of consumption to income; yet average propensities are the same over the six decades spanned by the table despite a sextupling of average income. This stability in average propensities is therefore inconsistent with the stability in the relations themselves.

However, this conclusion is valid only when the behavioral unit is the same for both time-series and cross-sectional data—otherwise different types of units could produce different measures of behavior. The data reviewed by Friedman involves comparisons of noncomparable consumer units because the coefficients describing cross-sectional behavior were derived from data relating to individual consumer units, while those describing time series behavior were estimated using average data.

The effect of this shift in consumer unit on estimates of spending behavior can be shown using Friedman's own data. Since the real average consumption and real average income figures from each cross-sectional study found in Table 1 form a time series on cross-sectional spending for selected years from 1888 to 1950, a time series consumption function can be estimated:

$$C_t = 33 + 0.87Y_t. \quad (9)$$

Results are similar to those for the Goldsmith estimate. The marginal propensity is 0.87 as compared to 0.91 and the average propensity is 0.89 as compared to 0.91, while the income elasticity is 0.98 as compared to 1.00. Of the two regression coefficients, only the slope is statistically significant ($t(b) = 19.06$ as compared to $t(a) = 0.37$), implying that consumption is proportional to income. Thus, data collected to refute Keynes' Law support it. Rather than indicating unusual spending behavior, cross-sectional data, when appropriately aggregated, produces spending estimates nearly identical to prevailing estimates of long-run behavior.

Alternate view

As indicated by Modigliani and Brumberg, critics of Keynes' Law did not find fault with Keynes' idea that consumption was a function of income. Instead, they objected to his emphasis on short run

or current rather than long run or lifetime spending behavior. Building on the "pure" or "accepted" theory of consumer choice,¹¹ they developed an alternative view of consumption based on the idea that consumer units are forward-looking. If, at a point in time, consumers seek to maximize the utility of consumption subject to an income constraint,

$$\max U(C_t) \text{ subject to } Y_t, \quad (10)$$

then rational consumers should also seek to maximize the utility from lifetime consumption, subject to the constraint of lifetime income,

$$\max U(C_1, \dots, C_t) \text{ subject to } (Y_1, \dots, Y_t). \quad (11)$$

Operationally, to implement this decision rule, lifetime consumption becomes a capital budgeting problem. Each consumer unit selects some annual lifetime consumption such that its present value equals the present value of its expected lifetime income plus the present value of any endowments, gifts, or inheritances minus any bequests or residual assets at death. Since income in any year is only a small fraction of the present value of expected lifetime income, the forward-looking model implies that consumption is independent of current income. Equally important, it also implies that consumption is not affected by temporary or transitory changes in income.

While this emphasis on the lifetime spending represents an unexceptional restatement of the conventional theory of household behavior in dynamic terms, its application to aggregate spending behavior is not obvious. After all, individual consumer units have different incomes, lifetimes, and expectations. To resolve this problem of aggregation, both Modigliani and Brumberg and Friedman assumed, without offering any justification, that all consumer units have the same expected income as measured by average income. This assumption had the further advantage of greatly simplifying the analysis of consumption by allowing spending to be analyzed in terms of the behavior of one representative spender rather than by many different spenders. Unfortunately, by reducing aggregate spenders to one, it had the great disadvantage of precluding consid-

¹¹ Both devoted considerable effort to this task, arguing the theory of consumer choice had "received inadequate attention" and that its "implications . . . have been incompletely recognized." See Modigliani and Brumberg (1954, pp. 390-397) and Friedman (1957, pp. 7-19).

eration of any distributional and demographic influences on aggregate behavior because with only one agent, income as well as age, race, or sex differences are meaningless.

A second, more difficult problem involved a long history of cross-sectional studies and surveys that consistently indicated that the current consumption decisions of consumer units largely depended on their current incomes.¹² These studies seemed to suggest that forward-looking consumer units follow separate, individual lifetime spending plans, based on their separate incomes, expectations, and anticipated longevity.¹³ This problem of cross-sectional spending was resolved using the concepts of "permanent" and "transitory" income that Friedman and Kuznets (1945) had developed in previous work. Permanent income was defined as average income while transitory income was simply income different than permanent income. These definitions allowed all individual incomes different than the average to be classified as transitory or unexpected, which, under the forward-looking model, have no consequence for consumption. Since the only remaining remnant of the cross sectional income is the average, all current incomes can be disregarded because the average is also a time series observation. In effect, critics rejected the Keynesian contention that consumption depended on current income by assumption rather than by showing that average income did in fact represent the permanent income of each and every consumer unit in the economy.¹⁴

Both Modigliani and Brumberg and Friedman used the income elasticity of consumption, defined at the mean as

$$\eta_{cy} = b\bar{y}/\bar{c} \quad (12)$$

¹² Cross-sectional data can be considered annual observations on the consumption and income of forward-looking, utility maximizing individuals.

¹³ Cross-sectional studies covering a variety of consumer units, time periods, and countries were collected by Ferber (1953) and Friedman (1957). See Table 1 above and the sources cited by Friedman. More recent studies are collected in Bunting (1998). Specific consideration of age, sex and race influences are found in various BLS consumer expenditure surveys. For examples with citations, see Bureau of Labor Statistics (1997a).

¹⁴ It should be noted that theories that assume the behavior of all individuals can be represented by a single agent or by average income are time-series, not cross-sectional theories. Cross-sectional behavior is meaningless when there is only one actor or income. Hence, rejection of all cross-sectional income data different from the average is in effect rejection of all cross-sectional data, again noting that the average is also a time series observation.

to indicate the existence of transitory income. According to Modigliani and Brumberg (1954, pp. 410, 416–417), when expected equaled actual income for every household, “the elasticity of consumption with respect to income is unity.” However, “in the presence of short-term fluctuations in income, the proportion of income consumed will tend to fall with income and the elasticity of consumption with respect to income will be less than one.” According to Friedman (1957, pp. 36, 52), the elasticity of consumption with respect to income “measures the fraction of the variance of measured income attributable to variation in the permanent component: the higher the elasticity, the smaller the importance of transitory factors relative to permanent factors” and that when the income elasticity equals one, “transitory components are all zero.” Thus, in the absence of transitory spending, the elasticity equals one,

$$\eta_{cy} = b\bar{y}/\bar{c} = 1,$$

and the proportional or time series consumption function results,

$$\bar{c} = b\bar{y}. \quad (13)$$

In words, the permanent/transitory distinction is simply argumentation to discredit cross-sectional data as a meaningful measure of consumer unit spending behavior.

The assumption that all consumer units have identical permanent incomes is implausible. Repeated Consumer Expenditure Surveys conducted by the Bureau of Labor Statistics have shown that individual incomes differ on the basis of individual human capital qualities, demographic characteristics such as age, sex, race, and wealth.¹⁵ If random or transitory influences actually determine the range of cross-sectional incomes, then the income and educational or demographic characteristics of households should not be correlated. They are. Higher income households in the cross-sectional data have a greater percent of college education and home ownership (representing wealth) than lower income ones. Both the fraction of nonwhites and female head of household is smaller for higher income households than for lower ones (Bunting, 1998). Dismissal of all incomes different than the average as transitory and of no consequence for aggregate consumption has ludicrous implications. In 1997 the average after tax income for consumer units was \$36,684. With

¹⁵ See footnote 13. For a discussion of cross sectional human capital, demographic, and wealth differences by income, see Bunting (1998).

grouped data, this average falls in the middle or third income quintile, implying that in 1997 the incomes of the other four quintiles, representing about 84 percent of all income earned, was transitory, and that 80 percent of 85 million consumer units experienced transitory conditions (Bureau of Labor Statistics, 1997b). Finally, the assumption that average income represents the permanent income for all consumer units cannot be true because average income is calculated from all incomes, including transitory ones. The correct measure should be calculated as the average of all individual permanent incomes, not of all incomes.¹⁶ This calculation is probably impossible with existing income data.

Like any classification criteria, the distinction between permanent and transitory income has to be used appropriately. In the context of individual earnings over time, the concepts have clear meaning because, as Friedman and Kuznets (1945) demonstrated, income received in a particular year can be compared with that expected as based on a history of earnings. However, they have little meaning when the incomes of cross sections of consumer units are compared. Comparison of the permanent income of one person with the transitory income of another has no meaning because individual characteristics and circumstances determine permanent income, while people experience different adverse and fortuitous earning events. Without the assumption of universally identical permanent income, cross-sectional transitory behavior is meaningless because individual permanent and transitory incomes can not be distinguished.

Regardless of the theoretical justification, when average income is used to measure expected income, cross sectional spending is no longer a meaningful economic activity. As shown by comparing Equations (4) and (5), when average income is substituted for consumer unit income, the consumption function becomes a proportional time series relationship. This substitution causes the coefficient describing individual behavior to be dropped from the function, thereby eliminating individual influences on spending. In effect, the elaborate theoretical arguments of Modigliani and Brumberg and Friedman are irrelevant for their refutation of Keynes' Law. Instead, when they assert that consumer unit income should only be measured by average income, the circumstances for which Keynes thought his law applied no longer exist and aggregate spending can only be measured by time-series data.

¹⁶ Since all aggregate income measures are composed of unknown fractions of permanent and transitory income, time series modeling of permanent spending behavior appears to have little meaning. The aggregate data should be purged of its transitory component, but a method is not apparent.

One or many

Critics of Keynes' Law claimed it was incomplete, produced incorrect predictions, and emphasized the wrong spending behavior. The first two objections are explained by the failure to understand the structure of the Keynesian consumption function and confusion over the effects of individual and average data on estimates of spending behavior. When the different types of data are carefully distinguished, estimates of the empirical model implied by Keynes' proposition are consistent with observed behavior, either cross sectionally or over time.

The third objection, referring to the Keynesian emphasis on current as opposed to lifetime spending behavior, is a methodological issue involving both theoretical insights and unjustified assumptions. In their criticisms, Modigliani and Brumberg and Friedman extended the theory of consumer choice to develop forward-looking models of spending behavior. These models clearly demonstrated that the consumption of individual consumer units is influenced by not only current income, but also by all incomes expected over a lifetime. Further, since any unexpected change in current income is a small fraction of lifetime income, such changes will not effect current consumption. However, they then assumed, without offering any justification, that average income represented the expected or permanent income for every consumer unit and that any income different than this average was unexpected or transitory. The effect of these assumptions was to dismiss all current economic activity different than the average as inconsequential and to deny that Keynes' Law had relevance for the study of aggregate consumption.

Although these assumptions entail a number of difficulties and implausibilities, a larger methodological issue is involved. While Keynes did not specify the motivation of the consumer units, he did indicate that "consumption—to repeat the obvious—is the sole end and object of all economic activity" (Keynes, 1936, p. 104), suggesting that consumption is a utility-maximizing activity, regardless of time perspective. Thus, his law is concerned with the results of utility-maximizing behavior rather than with its determinants. That is, prior to spending each consumer unit must formulate and devise its own lifetime consumption plan. Keynes observed that the results of these plans were highly correlated with current income and that the spending rate tended to decline with increased income.

On the other hand, the critics of Keynes' Law had another interest. They were concerned with investigating the characteristics and consequences of utility maximizing behavior. To develop their explanations

they needed to consider the implications of Keynes' Law simply because of its priority. As has been shown, they found the law inconsistent with the conditions they found important and convinced themselves, and the economics profession generally, that it had no relevance for their purposes and for the study of consumption.

Is there one theory of consumption or many? Like microeconomics, which has divided into the study of short and long run behavior, the study of aggregate consumption can be divided into studies of cross-sectional and time-series behavior. It is no more correct to judge one type of behavior as more meaningful than it is to judge the long run more important than the short run. Cross-sectional studies are largely concerned with the size and level of consumption and income while time series studies are more involved with exploring the forms and implications of aggregate utility maximizing behavior. The practical and theoretical consequences of these differences remain to be determined.

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