

Wage Indexation under a Changing Environment:

A Stylized Reading of Lopes and Bacha (1983)¹

In memory of Francisco Lopes

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Resumo: Lopes e Bacha (1983) explicaram os pesos de sua fórmula de indexação salarial a partir do intervalo legal entre reajustes. Retomamos essa construção e mostramos que, com reajustes escalonados, o crescimento salarial agregado é exatamente uma média da inflação observada durante o último intervalo de reajuste. A fórmula de Lopes–Bacha é uma aproximação simples dessa relação, exata quando a inflação varia linearmente. Para o Brasil em 1978–80, os erros dessa aproximação são pequenos: a principal diferença entre inflação e crescimento salarial decorre da defasagem dos reajustes. A mudança do intervalo em 1979 requer uma análise de transição.

Abstract: Lopes and Bacha (1983) explained the weights in their wage-indexation formula from the legal interval between wage settlements. We revisit their construction and show that, when settlements are staggered over time, aggregate wage growth is exactly an average of inflation over the most recent settlement interval. The Lopes–Bacha formula is a simple approximation to this relationship, exact when inflation changes linearly. For Brazil in 1978–80, approximation errors are small: the main difference between inflation and wage growth reflects the lag in wage adjustments. The 1979 change in the settlement interval, however, requires a transition analysis.

Keywords: wage indexation; inertial inflation; wage policy; Brazil; period analysis; Lopes–Bacha model.

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¹ The algebra and its numerical verification were checked in dialogue with Claude (Anthropic) and ChatGPT. The argument, the historical framing and the interpretation of the 1979–80 episode are the authors' own.

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1. Introduction

The wage-indexation formula associated with Lopes and Bacha (1983) has two distinct origins. The functional form was introduced in Bacha (1980), where nominal wages were represented as a geometric weighted average of the current and preceding price levels. In rates of change,

$$\hat{w}_t = h\pi_t + (1 - h)\pi_{t-1}, \quad (1)$$

where $\hat{w}_t = \ln w_t - \ln w_{t-1}$ and $\pi_t = \ln p_t - \ln p_{t-1}$. Here $\ln w_t$ is the average, over period t , of the aggregate log wage (the mean of log wages across workers at each instant), and $\ln p_t$ is the average of the log price level over the same period. Equation (1) thus relates period averages: its purpose is to translate staggered institutional wage adjustment into a tractable relation between period variables.

In Bacha (1980), h was a free parameter measuring the extent to which wages responded to current rather than past prices. Lopes and Bacha (1983) gave this parameter an institutional interpretation. If there are n wage adjustments per period, they obtained⁴

$$h = 1 - \frac{1}{2n}. \quad (2)$$

The purpose of the present note is to revisit the relation between these two steps.

The institutional interpretation must first be stated carefully. The continuous-time construction used by Lopes and Bacha is not a literal representation of the Brazilian statutory wage rule. The latter was more complicated: it combined backward-looking adjustment with a provision for expected residual inflation and subsequently incorporated corrections for forecast errors, while the legislation also included productivity considerations. The institutional history itself was changing over time; see Simonsen (1995) and Carvalho (1982). As Lopes (1984, n. 1) later noted, the principle represented by the construction — full restoration of the previous real-wage peak at each settlement — was formally instituted only by Law 6.708 of 1979, held only approximately from 1968 onwards, and ceased to hold in practice after Decree-Law 2.012 of 1983.

The continuous-time construction should therefore be understood as a device for representing one particular feature of the legislation: wages were reset at legally determined intervals and the dates of adjustment were staggered across workers. The analysis below is conditional on that construction. It does not claim that the construction reproduces the Brazilian legal mechanism in all its institutional detail.

⁴ The functional form of equation (1) comes from lectures given at the BNDES in June 1980, published as Bacha (1980); there h measures wage resistance and the readjustment interval does not appear. Working from that text, Lopes developed the connection to compulsory wage policy and derived equation (2), which is already present in the working-paper version of the joint article (Lopes and Bacha, 1980).

This qualification concerns the construction, not the mathematics. The construction simplifies the Brazilian legal rule; given the construction, aggregate wage growth is exactly a moving average of inflation, and equation (1) is its two-point approximation. The Lopes–Bacha formula is recovered exactly when inflation is linear over the relevant interval and is otherwise an approximation whose error depends on the curvature of inflation.

This is useful for interpreting the Brazilian experience of 1978–80. The fact that inflation was changing rapidly does not invalidate equation (1). Nor does the difference between equation (1) and the exact continuous-time aggregation measure the whole effect of wage lag. The latter is already incorporated in the formula. The approximation error is an order of magnitude smaller than the effect of the wage lag itself.

A separate issue arises from the change in the legal settlement interval in late 1979. Law 6.708 of October 1979 shortened the interval from twelve months to six, taking effect in November of that year, at the same time as the second oil shock was feeding into Brazilian costs. Lara-Resende and Lopes (1981) argued that the shortening contributed materially to the inflationary acceleration that followed. Their argument, and the wider claim that Brazilian inflation was largely inertial, became the analytical core of the literature that led to the heterodox-shock stabilization proposals of the mid-1980s — largely through Lopes’s own work, collected in Lopes (1986). Such a change cannot be treated simply as a change in n inside a stationary period-analysis relation. A change in the institutional periodicity changes the distribution of wage cohorts, and describing the historical path from the old regime to the new one would require a transition analysis that follows those cohorts. This note does not undertake that analysis. Section 6 compares the two stationary regimes and explains why the period-analysis formula cannot, by itself, describe the transition between them; modeling the transition is left for future work.

The note proceeds as follows. Section 2 restates the period-analysis representation and gives a simple interpretation of the coefficient h . Section 3 states the exact aggregate relation within the continuous-time Lopes–Bacha construction. Section 4 compares it with the two-point formula and characterizes the approximation error. Section 5 discusses the Brazilian episode of 1978–80. Section 6 considers the change in the settlement interval. Section 7 concludes. Derivations are collected in the Appendix.

2. The Lopes–Bacha Formula as a Period-Analysis Representation

2.1 Period analysis

The analysis uses period averages rather than continuous-time variables, as defined below equation (1). Equation (1) is therefore a representation of the timing with which the average wage responds to price changes. It describes how the period average of the aggregate wage changes from one period to the next; it is not a statement about how the aggregate wage changes at a point in time.

2.2 The average-age interpretation

Suppose that wages are adjusted n times per period and that adjustment dates are uniformly distributed across workers. The interval between adjustments is therefore $1/n$. At any instant, the wages in force have ages ranging uniformly from zero to $1/n$, so their average age is $1/(2n)$.

If the two-period representation (1) is written as a distributed lag, its mean lag is $h \cdot 0 + (1 - h) \cdot 1 = 1 - h$. Equating it to the average age of wages gives $1 - h = 1/(2n)$, which is equation (2). Thus $h = 1/2$ under annual adjustment and $h = 3/4$ under semiannual adjustment.

This heuristic argument does not require the integration of an individual wage path. It also does not require constant inflation.

The argument does, however, have a precise scope. It calibrates the coefficient in the two-point representation conditional on that functional form. By itself, it does not establish that the two-point representation is the exact aggregate relation for an arbitrary inflation path. That stronger question is addressed next.

3. Exact Aggregation within the Continuous-Time Construction

Consider now the continuous-time construction that underlies Lopes and Bacha's formula. Measure time in units of the period of analysis (a year, say), and suppose that each worker's nominal wage is readjusted n times per period, that is, every $1/n$ periods. Different groups of workers have different settlement dates, and these dates are spread uniformly over the settlement interval: at any moment, the same number of workers is being readjusted. Call a *cohort* the group of workers whose wage was last readjusted at a given date τ .

Between settlements a cohort's nominal wage stays fixed, so its real wage is eroded by rising prices. At each settlement the nominal wage is raised in proportion to the price increase since the previous settlement, which restores the cohort's real wage to the level it had at that previous settlement. The nominal wage of the cohort readjusted at τ can therefore be written as

$$\ln w_\tau - \ln p_\tau = c(\tau), \quad (3)$$

where $c(\tau)$ is the log real wage the cohort obtains at the moment of its readjustment. Because each readjustment restores the previous peak, the cohort readjusted at $\tau + 1/n$ (the same workers one cycle later) obtains the same peak: $c(\tau + 1/n) = c(\tau)$, so c is periodic with period $1/n$. Nothing requires this peak to be the same across cohorts with different settlement dates; the analysis below allows each cohort to have its own.

The formulation in (3) is deliberately stylized. It captures the resetting of the real wage at adjustment dates and its subsequent erosion by prices, but it abstracts from the additional institutional provisions of the Brazilian wage law.

The aggregate relation follows in two steps. First, consider the economy at a given instant s . The cohorts active at s are those adjusted during the last settlement interval, $[s - 1/n, s]$, and with uniform staggering each date in that interval carries the same weight. Averaging (3) over these cohorts, the terms $c(\tau)$ add up to a constant C , because the interval covers exactly one full cycle of c . The aggregate log wage at s is therefore

$$W_s = C + n \int_{s-1/n}^s \ln p_\tau d\tau, \quad (4)$$

a uniform moving average of log prices over the last settlement interval. At any instant, the aggregate wage reflects the prices prevailing, on average, $1/(2n)$ periods earlier.

Second, the wage in equation (1) is not the wage at an instant but its average over the period of analysis, and π_t is likewise the change in the period-average price level.

Averaging (4) over each period and taking the change between successive periods therefore turns the moving average of prices into a moving average of period-average inflation (Appendix A.1):

$$\hat{w}_t = n \int_0^{1/n} \pi_{t-v} dv, \quad (5)$$

where π_τ denotes period-average inflation measured over a period of analysis ending at date τ , for any τ and not only at the ends of calendar periods. Aggregate wage growth over period t is thus the average of period inflation over the most recent settlement interval. Equation (5) is the exact aggregate relation within the continuous-time wage-setting construction used by Lopes and Bacha.

Several features deserve emphasis. First, no assumption about the path of inflation is required. Second, no common real-wage peak across cohorts is required: the periodic component $c(\tau)$ disappears upon aggregation. Third, the exact relation has a transparent interpretation: aggregate wage growth is the average of inflation over the most recent wage-adjustment interval. The mean lag of this uniform kernel is $1/(2n)$. Thus, the exact formula confirms the heuristic argument of Section 2.2.

4. Lopes–Bacha as a Two-Point Approximation

Equation (5) also clarifies precisely the status of equation (1). Suppose that π_τ is linear in τ over the interval $[t - 1, t]$. Then the average of π over $[t - 1/n, t]$ is its value at the midpoint, $\pi_{t-1/(2n)}$, and

$$n \int_0^{1/n} \pi_{t-v} dv = \left(1 - \frac{1}{2n}\right)\pi_t + \frac{1}{2n}\pi_{t-1} = h\pi_t + (1 - h)\pi_{t-1}. \quad (6)$$

Thus, the Lopes–Bacha formula is exact for a linear inflation path within the continuous-time construction. This is a somewhat stronger result than the

constant-inflation case originally emphasized in Lopes and Bacha (1983): constant inflation is simply a special case of linear inflation.

For a nonlinear inflation path, equation (1) is the corresponding two-point approximation to the exact moving average (5). It has the same total weight and, importantly, the same mean lag. Its error,

$$E_t = n \int_0^{1/n} \pi_{t-v} dv - [h\pi_t + (1-h)\pi_{t-1}], \quad (7)$$

therefore vanishes for constant and linear inflation and depends on the curvature of the inflation path rather than on the level or the trend of inflation. Since (5) holds for any price path, the error (7) can be computed, analytically or numerically, for any inflation process.

This distinction is central. The difference between current inflation and wage growth can be large because wages are staggered. That difference is not an approximation error: it is the economic content of the wage lag. The approximation error is only the difference between the exact moving average in (5) and its two-point representation in (1). A rapidly changing inflation rate therefore need not imply a large error: what matters is not the change in inflation per se, but the extent to which the path departs from linearity.

5. The Brazilian Episode, 1978–80

The distinction between wage lag and approximation error is particularly important for Brazil's inflation acceleration of 1978–80.

Suppose, for simplicity, that changes in instantaneous inflation occur at period boundaries and that inflation is constant within each calendar year. Let $\hat{q}_t$ denote end-to-end inflation in year t . Then (Appendix A.2)

$$E_t = -\frac{3n-2}{12n^2} \Delta^2 \hat{q}_t. \quad (8)$$

The error is proportional to the second difference of end-to-end inflation. A change in the inflation rate that is linear through time therefore produces no error; a sharp change in its acceleration does. For annual adjustment ($n = 1$) and for semiannual adjustment ($n = 2$) the coefficient happens to be the same, $E_t = -\Delta^2 \hat{q}_t / 12$. A single step change in inflation thus produces an error of $-1/12$ of the step in the first year with the new rate, $+1/12$ in the following year, and nothing thereafter. The errors sum to zero, so the formula misallocates wage growth across years but reaches the right wage level once the transition is over. When the step falls inside a period rather than at its boundary, the error is spread over three periods, still sums to zero, and never exceeds $1/12$ of the step (Appendix A.3).

These are approximation errors, not corrections to the wage lag itself. Using annual inflation rates of approximately 40 percent in 1978, 77 percent in 1979, and 110 percent in 1980, or 0.336, 0.571 and 0.742 in log points, and treating them as step changes at the turn of each year, $\Delta^2 \hat{q}_{1980} \approx -0.064$ and equation (8) gives an error of about $+0.005$ log points in 1980.

Monthly inflation data make it possible to calculate the exact moving average (5) without imposing the piecewise-constant assumption behind (8). Table 1 reports the results for annual and semiannual adjustments, using the monthly IPC-FIPE index for São Paulo, which, unlike the INPC (available only from April 1979) and the IPCA (from December 1979), covers the whole of 1976–80.

Table 1. Exact aggregate wage growth and the Lopes–Bacha approximation, Brazil, 1978–80 (log points)

Year	π_t	$n = 1 (h = 1/2)$			$n = 2 (h = 3/4)$		
		Exact	L–B	Error	Exact	L–B	Error
1978	0.3235	0.3290	0.3312	–0.0022	0.3221	0.3274	–0.0053
1979	0.3940	0.3514	0.3588	–0.0073	0.3689	0.3764	–0.0075
1980	0.5660	0.4795	0.4800	–0.0005	0.5241	0.5230	+0.0012

Source: IPC-FIPE, monthly variation (Banco Central do Brasil, SGS series 193); authors’ calculations. “Exact” is equation (5) computed from monthly log inflation; “L–B” is equation (1); Error = Exact – L–B. The period of analysis is the calendar year and n is held fixed in each calculation.

Table 1 shows that the errors are small in every year. Under annual adjustment they range from –0.0005 to –0.0073; under semiannual adjustment, from –0.0075 to +0.0012. The largest errors occur in 1979, when monthly inflation accelerated in the second half of the year: with acceleration, the formula overstates wage growth, as (7) predicts. They amount to about 2 percent of that year’s wage growth.

Replacing IPC-FIPE by the INPC from April 1979 onwards leaves 1978 unchanged and widens the errors slightly, to between –0.011 (1979, $n = 2$) and +0.005 (1980, $n = 2$). In every case the error is at most about 3 percent of the year’s wage growth.

Small approximation errors do not mean that the wage lag was small. In 1980, period inflation was 0.566 log points, while exact wage growth under annual adjustment was 0.480. This gap of 0.086 log points reflects the lag in wage adjustments, and the Lopes–Bacha formula reproduces it to within a thousandth of a log point. What the two-point representation adds, relative to the exact moving average, is comparatively small.

6. What Changes When the Settlement Interval Changes?

The shortening of the statutory wage-adjustment interval in late 1979 raises a different issue. Before the change, the stylized representation has $n = 1$ and $h = 1/2$; after the

change to semiannual adjustment, $n = 2$ and $h = 3/4$. Thus the change in the institutional periodicity changes the weights in the period-analysis representation⁵.

The exact aggregation result in Section 3 assumes that settlement dates are uniformly distributed over the settlement interval. If the legal interval changes, the existing population of workers does not instantaneously acquire a new uniform distribution of wage ages. The transition therefore involves the evolution of cohorts created under the old regime and cohorts created under the new regime. Substituting the new n into (5) or (1) describes the new stationary regime, not the path by which the economy reaches it.

This point is especially relevant to the interpretation of the 1979 reform. The change in periodicity can be represented within the Lopes–Bacha framework as a change in the institutional parameter n , but describing the actual adjustment process requires a cohort model of the transition, which this note does not attempt. Lopes (1984, p. 475) himself observed that the same technique of analysis could be applied to periods of change in periodicity; the exact moving-average form (4), in which the aggregate wage averages prices over a window of length $1/n$, suggests a natural starting point for that exercise.

This limitation is conceptually different from the approximation issue discussed in Sections 4 and 5. The latter concerns the accuracy with which a given, fixed-periodicity continuous-time construction is represented by equation (1). The former concerns a change in the institutional structure generating the wage cohorts in the first place.

7. Conclusion

The continuous-time construction of Lopes and Bacha (1983) provides a useful bridge between staggered institutional wage adjustment and period analysis. But its institutional interpretation should remain appropriately modest. The construction is a stylization of Brazil’s wage legislation, not a literal representation of its full legal mechanism. In particular, it abstracts from productivity adjustments, residual-inflation estimates, forecast errors, and other institutional provisions.

Within that stylized construction, however, the connection between the settlement interval and the coefficient in the Lopes–Bacha formula is particularly simple. With n uniformly staggered adjustments per period, the average age of wages in force is $1/(2n)$, which immediately gives $h = 1 - 1/(2n)$. More importantly, the construction itself can be aggregated exactly: aggregate wage growth is the average of period inflation over the most recent settlement interval, equation (5). The Lopes–Bacha formula is the corresponding two-point approximation. It has the same mean lag and is exact whenever inflation is linear over the relevant interval.

⁵ In the Lopes–Bacha model, equation (1) is combined with a Phillips-type price equation, $t = wt + jut - u + zt$, where ut is capacity utilization, u its normal level and zt a supply shock. Then $t - t - 1 = 2njut - u + zt$, so that moving from annual to semiannual adjustment doubles the inflationary impact of a given utilization gap or supply shock. This gives formal content to the argument of Lara-Resende and Lopes (1981), but it compares two stationary regimes and does not describe the transition between them.

This result changes the interpretation of changing inflation. A changing inflation rate does not invalidate the Lopes–Bacha representation. For the step-change experiments considered here, the approximation error is transient and sums to zero, so it affects the timing of wage growth but not the wage level after the transition. For the Brazilian 1978–80 episode, that error was small relative to the much larger effect of the wage lag itself.

The distinction also clarifies what can and cannot be inferred from the change in statutory wage periodicity in 1979. Changing n changes the stationary representation of wage adjustment, from $h = 1/2$ under annual adjustment to $h = 3/4$ under semiannual adjustment. But the period-analysis formula does not by itself describe the transition between the two regimes. That transition requires following the cohorts of workers adjusted under the old and new rules, a task we leave for future work.

The main result of the note can therefore be stated succinctly: within the continuous-time wage-setting construction of Lopes and Bacha, their formula is not an exact description for every inflation path, but it is the natural two-point representation of an exact moving-average relation, with the institutional coefficient determined by the average age of wages in force.

Appendix

A.1 Exact aggregation

Let the period of analysis have unit length and let there be n wage adjustments per period, so that the interval between settlements is $1/n$. Let τ denote the date of the most recent adjustment of a cohort. By (3), $\ln w_\tau = \ln p_\tau + c(\tau)$. With settlement dates uniformly distributed, the cohorts active at date s are those adjusted during $[s - 1/n, s]$, with density n , and the aggregate log wage at s is

$$W_s = n \int_{s-1/n}^s \ln w_\tau d\tau = C + n \int_{s-1/n}^s \ln p_\tau d\tau, \quad (A1)$$

which is (4) in the text; the second equality holds because the integral of $c(\tau)$ over one complete cycle is a constant C . The instantaneous aggregate wage is thus a uniform moving average of log prices over the last settlement interval. Its change over one period,

$$W_s - W_{s-1} = n \int_0^{1/n} (\ln p_{s-v} - \ln p_{s-v-1}) dv,$$

is the average, over the last $1/n$ periods, of end-to-end inflation over one period. For $n = 1$ this is exactly π_s .

The wage in equation (1), however, is the average over the period, not the wage at an instant. Let $p_{\tau}^{-} = \int_{\tau-1}^{\tau} \ln p_u du$ and $\pi_{\tau} = p_{\tau}^{-} - p_{\tau-1}^{-}$, defined for any date τ . The log of the period-average wage is $\int_{t-1}^t W_s ds$, so that

$$\hat{w}_t = \int_{t-1}^t (W_s - W_{s-1}) ds = n \int_{t-1}^t \int_0^{1/n} (\ln p_{s-v} - \ln p_{s-v-1}) dv ds.$$

Reversing the order of integration,

$$\hat{w}_t = n \int_0^{1/n} (p_{t-v}^{-} - p_{t-v-1}^{-}) dv = n \int_0^{1/n} \pi_{t-v} dv, \quad (A2)$$

which is equation (5). It holds for any path of prices.

If π_{τ} is linear on $[t-1, t]$, the average over $[t-1/n, t]$ equals the midpoint value $\pi_{t-1/(2n)} = (1 - 1/(2n))\pi_t + (1/(2n))\pi_{t-1}$, which is equation (6). The exact kernel (uniform on $[0, 1/n]$) and the two-point kernel (weights h and $1 - h$ at lags 0 and 1) have the same mass and the same first moment, $1/(2n)$; hence the error (7) disappears for constant or linear inflation and is generated by curvature.

A.2 Step changes at period boundaries

Let instantaneous inflation be constant within each period, equal to $\hat{q}_t$ in period t , with changes occurring only at period boundaries. The log price level then rises linearly within each period, the geometric average price of period t is the average of its two endpoints, $p_t^{-} = \ln p_{t-1} + \hat{q}_t/2$, and

$$\pi_t = \frac{1}{2}(\hat{q}_t + \hat{q}_{t-1}), \quad (A3)$$

an exact period-by-period relation between period-average and end-to-end inflation. Evaluating (A2) under these assumptions gives

$$\hat{w}_t = \pi_t - \frac{\Delta \hat{q}_t}{2n} + \frac{\Delta^2 \hat{q}_t}{6n^2}. \quad (A4)$$

Using (A3) to write $h\pi_t + (1 - h)\pi_{t-1} = \pi_t - \frac{1}{4n}(\Delta \hat{q}_t + \Delta \hat{q}_{t-1})$ and subtracting from (A4),

$$E_t = -\frac{\Delta \hat{q}_t - \Delta \hat{q}_{t-1}}{4n} + \frac{\Delta^2 \hat{q}_t}{6n^2} = -\frac{3n-2}{12n^2} \Delta^2 \hat{q}_t, \quad (A5)$$

which is equation (8). Two implications are worth noting. First, the term $-\Delta \hat{q}_t / (2n)$ in (A4) is not an error of the formula: it arises from writing π_t alongside $\hat{q}$, and it is absorbed by the lag structure of (1). Second, (A3) implies $\pi_t - \pi_{t-1} = \hat{q}_t - \hat{q}_{t-1}$, the auxiliary aggregation rule of Lopes and Bacha (1983, eq. 6), whenever $\Delta^2 \hat{q}_t = 0$, that is, under linear and not only constant inflation.

A.3 A step change within a period

Let instantaneous inflation change from s_0 to $s_1 = s_0 + \Delta s$ at a date that leaves a fraction $a \in [0, 1)$ of the calendar period after the change; a change on 1 November, with calendar years as periods, has $a = 2/12$. Let E_0 denote the error in the period of the change and E_1, E_2 the errors in the two following periods, so the subscript k refers to $k + a$ periods after the change. Evaluating (A2) and (1) under the step path gives, for $n = 1$,

$$E_0 = -\Delta s \frac{a^2(3-2a)}{12}, \quad E_1 = -\Delta s \frac{1-6a^2+4a^3}{12}, \quad E_2 = \Delta s \frac{(1-a)^2(1+2a)}{12},$$

and $E_k = 0$ for $k \geq 3$. The three errors sum to zero for every a , and none exceeds $\Delta s/12$ in absolute value, the bound being reached at $a = 0$, the case of Appendix A.2. Table A1 reports the errors for selected values of a , for $n = 1$ and $n = 2$. With acceleration ($\Delta s > 0$), the formula overstates wage growth in the period of the change (and in the next one if $a < 1/2$) and understates it later.

Table A1. Approximation errors after a step change in inflation (multiples of Δs)

a	$n = 1$			$n = 2$		
	E_0	E_1	E_2	E_0	E_1	E_2
0	0	-0.083	0.083	0	-0.083	0.083
2/12	-0.006	-0.071	0.077	-0.009	-0.065	0.074
0.25	-0.013	-0.057	0.070	-0.018	-0.047	0.065
0.50	-0.042	0	0.042	-0.052	0.021	0.031
0.75	-0.070	0.057	0.013	-0.076	0.068	0.008

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