

Exhibit No.:
Witness: Joseph H. Haslag
Type of Exhibit: Direct Testimony
Issues: Rate Design
Sponsoring: Noranda Aluminum, Inc.
Party: ER-2014-0258
Case No.:

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

_____)
In the Matter of the Union)
Electric Company, d/b/a)
Ameren Missouri's Tariff to) **Case No. ER-2014-0258**
Increase its Revenues for)
Electric Service)
_____)

Direct Testimony of Joseph H. Haslag

On behalf of

Noranda Aluminum, Inc.

December 19, 2014

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

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)
In the Matter of the Union)
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Electric Service)
_____)

STATE OF MISSOURI)
) SS
COUNTY OF BOONE)

Affidavit of Joseph H. Haslag

Joseph H. Haslag, being first duly sworn, on his oath states:

1. My name is Joseph H. Haslag. I am a professor in Economics at the University of Missouri. My business address is Department of Economics, University of Missouri, Columbia, Missouri 65211.

2. Attached hereto and made a part hereof for all purposes is my direct testimony, which was prepared in written form for introduction into evidence in Missouri Public Service Commission Case No. ER-2014-0258.

3. I hereby swear and affirm that the testimony is true and correct.

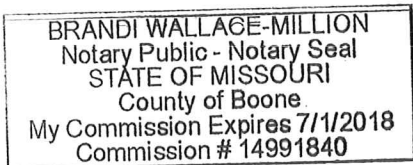
Joseph H. Haslag

Joseph H. Haslag

Subscribed and sworn to before me this 16 day of December, 2014.

Brandi Wallace Million

Notary Public



**Before the
Missouri Public Service Commission**

Case No. ER-2014-0258

Prepared Direct Testimony of Joseph H. Haslag

1 **Q: Please state your name and business address.**

2 A: Joseph H. Haslag; Department of Economics, University of Missouri, Columbia,
3 MO 65211.

4

5 **Q: What is your occupation, where are you employed and how long have you
6 held your current position?**

7 A: I am a professor in Economics at the University of Missouri. I have been in my
8 current position for fourteen years.

9

10 **Q: Please summarize your educational background and experience.**

11 A: I was conferred a PhD in Economics from Southern Methodist University. I served
12 as an economist in the Research Department at the Federal Reserve Bank of St.
13 Louis and Dallas. I was adjunct faculty at Southern Methodist University from 1988
14 through 2000, and faculty at the University of Missouri since 2000. I attach my vita
15 hereto. It is current and accurate.

16

17

Summary and Conclusions

18 **Q: What is the purpose of your testimony?**

19 A: The purpose of my testimony is to explain the impact that Noranda's New Madrid
20 Smelter has on the economy of the state of Missouri. Other witnesses will explain

1 the impact of Ameren Missouri's electric rates on Noranda and the potential they
2 have to cause the closure of Noranda's smelter. My testimony is provided to assist
3 the Commission in understanding the consequences to Missouri's economy that
4 would result from a closure of Noranda's New Madrid Smelter.

5
6 **Q: Please explain your approach to measuring the impact of the closing of**
7 **Noranda's smelter on Missouri's economy.**

8 A: I have quantified the impact of closing Noranda's smelter in terms of the effect on
9 the value of final goods and services produced within Missouri's borders each
10 year; that is, Missouri's state Gross Domestic Product (GDP). In addition, I have
11 computed the effect on state and local government tax collections that arise from
12 the shrunken tax base, and on the expected unemployment insurance payments
13 arising because of layoffs.

14
15 **Q: What facts have you relied on in preparing your testimony, and what is the**
16 **source of that information?**

17 A: According to Noranda:

18 Noranda is an integrated aluminum manufacturer. The
19 manufacturing of aluminum is an energy-intensive and capital-
20 intensive commodity business.

21
22 In addition to its smelter near New Madrid, Missouri, Noranda owns
23 and operates a bauxite mine in Jamaica and an alumina refinery in
24 Gramercy, Louisiana. The New Madrid Smelter produces molten

1 aluminum and converts molten aluminum to aluminum products
2 such as billet, rod, foundry products and primary ingots. The smelter
3 has been operating in Southeast Missouri since February 25, 1971.
4 Its primary product inputs are electricity and alumina. The alumina is
5 delivered via barge over the Mississippi River. Alumina, also known
6 as aluminum oxide, is produced from bauxite ore. The New Madrid
7 Smelter processes the alumina through three production lines that
8 electrolytically convert aluminum oxide into molten aluminum. The
9 process requires an unusually large amount of electricity. On an
10 annual basis, the New Madrid Smelter purchases about the same
11 amount of electricity as the entire city of Springfield, Missouri.
12 Electricity must also be constantly available to the production lines,
13 otherwise the lines will be damaged from liquid metal solidifying in
14 the lines. When at full production, the smelter produces more than
15 260,000 metric tons of aluminum per year. The aluminum is sold
16 primarily in North America. Noranda is one of the largest foil
17 producers in North America and a major producer of light gauge
18 sheet products.

19
20 Noranda has supplied data on production of aluminum and on market prices at
21 which aluminum is sold. My testimony is based on the data provided by Noranda.
22 The economic modeling and the calculations described below are solely my
23 determinations. I ran my analysis to consider three scenarios: closure of the New

1 Madrid Smelter in ** ____ **; closure of the New Madrid Smelter in ** ____ **; and
2 closure of the New Madrid Smelter in ** ____ **.

3
4 **Q: How would you summarize your conclusions?**

5 A: Overall, the New Madrid smelting facility, operated by Noranda, has a large
6 economic impact compared to typical business operations in Missouri. It employs
7 a large number of people and has valuable equipment utilized to smelt aluminum.
8 It is my conclusion that the three main economic impacts of the closing of
9 Noranda's New Madrid Smelter would be:

10
11 1. GDP Loss

12 Over a generation, the impact that the New Madrid facility has on the Missouri
13 economy is, after discounting, computed to be \$10.08 billion over the 25 years
14 starting in 2016, to be \$9.4 billion over the 25 years starting in 2017, and to be
15 \$8.76 billion over the 25 years starting in 2018. Over the ten years starting in 2016,
16 the loss in real GDP to the Missouri economy is \$4.8 billion, starting in 2017 \$4.19
17 billion and starting in 2018 \$3.6 billion. Thus, Missouri's economy would forego
18 something like \$9 billion in economic activity over a generation if the Noranda
19 smelter were closed.

20
21 2. State and Local Taxes

22 Local tax collections would be reduced. Over a generation, the present value
23 impact that the New Madrid facility has on net general revenue is computed to be
24 \$383 million over the 25 years starting in ** ____ **, to be \$357.4 million over the 25

1 years starting in ** ____ **, and to be \$332.9 million over the 25 years starting in
2 ** ____ **. Over the ten years starting in ** ____ **, the present value net general
3 revenue impact from the New Madrid facility is \$182.6 million, starting in ** ____ **
4 \$159.1 million and starting in ** ____ ** \$136.8 million.

6 3. Unemployment Insurance Benefits

7 Were the Noranda smelter to shut down, layoffs would result. There are 889
8 employees eligible for unemployment insurance benefits at the New Madrid
9 Smelter. When the smelter shuts down, the expected value of unemployment
10 insurance benefits paid by the state of Missouri is at least \$2.7 million. The \$2.7
11 million value is based on the long-run average value for unemployment spells.
12 Note that if we take current business cycle conditions into account, the expected
13 unemployment spell would be longer. At present, the length of the unemployment
14 is higher than the long-run average. Indeed, unemployment insurance benefits
15 paid to Missouri residents could be as high as \$9.4 million under the current rules
16 governing unemployment insurance benefits.

17
18 **Q: Are your conclusions based on generally accepted economic theory?**

19 A: Yes. Economic theory provides the basis for my calculations. I follow the *Ak*
20 growth model developed by Rebelo (1991) and implemented by Ireland (1996) to
21 compute the effect that the reduction in the factor inputs—people, machines, and
22 equipment—would have on the Missouri economy. The basic idea is that physical
23 capital and human capital are combined to produce goods and services. The

1 value of those goods and services is what is known as Gross Domestic Product
2 (GDP). Here, I focus on the measure of GDP at the state level.

4 Analysis

5 **Q: What mathematical formula did you use to calculate the effect of Noranda's**
6 **smelter on Missouri's Gross Domestic Product?**

7 A: Formally, the production of final goods and services produced within Missouri's
8 boundaries is represented by the function

$$9 \quad Y_t = Ak_t \quad (\text{equation (1)})$$

10 where Y stands for Missouri's GDP for a year indexed by t , k is the quantity of
11 human and physical capital employed at date t , and A is the technology that
12 represents the rate at which human and physical capital are transformed into units
13 of final goods and services.

14
15 This equation serves as the basis for computing the effect that Noranda's New
16 Madrid Smelter has on the Missouri economy. Here, there is a market value of the
17 smelter's physical and human capital. If the smelter shuts down, there is an
18 immediate impact on the value of goods and services produced in Missouri. This
19 shock to the Missouri economy is captured by an immediate reduction in the
20 state's GDP.

21
22 Over time, there are changes to the Missouri economy that occur because of the
23 smelter closure. This model explicitly deals with changes occurring over time. You
24 can see this explicitly in equation (1) by the fact that output and the capital input

1 both have time subscripts. Equation (1) represents the relationship between
2 output and the capital input at a particular date. In other words, output is measured
3 *at a point in time*, which is typically a year. As the time subscripts change, the
4 model economy is capturing how Missouri's GDP evolves over time. For example,
5 the *Ak* model allows for the Missouri economy, on average, to grow over time.
6 With this growth feature in the model economy, I can conduct the following
7 experiment. Specifically, I can compute the evolution of the Missouri economy
8 over time, with and without production at Noranda's New Madrid Smelter.

9
10 **Q: Does this model take into account changes to Missouri's economy over**
11 **time?**

12 A: Yes. Since the changes impact the Missouri economy over time, this model
13 explicitly deals with the time domain. Indeed, the time subscript (represented by
14 the small *t* in the equation) identifies the relationship between human and physical
15 capital and GDP *at a specific period of time*. By allowing the time period to change,
16 the model economy allows for Missouri's GDP to evolve over time. More
17 concretely, the *Ak* model replicates the fact that the Missouri economy, on
18 average, grows over time. I used this feature of the model economy to compute
19 the evolution of the Missouri economy over time, with and without production at the
20 Noranda Smelter.

21
22 **Q: Is there another way of describing your computation?**

23 A: Yes. I have used the economic model described above to quantify the impact of
24 Noranda's smelter on the Missouri economy. This impact is computed by

1 considering the following thought experiment. The baseline path involves the path
2 for the Missouri economy over time *with* the Noranda smelter, and all other human
3 and physical capital employed in Missouri. This baseline serves as the control for
4 the experiment. I then consider three possible scenarios: smelter closure in
5 **** _____**, closure in **** _____** and closure in **** _____**. The implication is that fewer
6 people and fewer machines are employed in the Missouri economy when
7 Noranda's New Madrid Smelter shuts down. In addition, by shutting down the
8 smelter, there is a new path for Missouri's GDP. Over time, through economic
9 growth, resources will be employed in some productive capacity. The key point is
10 that it is as if the Missouri economy starts from a lower value of GDP and then
11 grows because of the smelter shutdown. The economic impact then is the
12 comparison of two paths for Missouri's GDP; that is, one with the Noranda smelter
13 operating and another with the Noranda smelter shut down. I conduct this analysis
14 for three periods of twenty-five years, the length of a generation, beginning in
15 **** _____**, **** _____**, and **** _____**. I also compute the economic impact over three
16 ten-year spans beginning in **** _____**, **** _____**, and **** _____**. Over whatever
17 span of time I examine, the difference between the two paths is the measure of the
18 economic impact of the Noranda smelter.

19
20 To draw on a medical analogy, consider two patients who have the same diseases.
21 The control patient is treated with a placebo while the other patient is treated with
22 an experimental drug. The effect of the drug is measured by the difference
23 between the health outcome of the control patient and the health outcome of the
24 patient treated with the experimental drug. For the purposes of measuring the

1 economic impact, hold everything else constant in the Missouri economy, close
2 the Noranda Smelter, and compare the two outcomes. The economic version of
3 this analogy is the idea that the Missouri economy is “treated” by a shutdown of the
4 New Madrid Smelter. In this view, closing the Noranda smelter has a treatment
5 effect on the Missouri economy and an operating Noranda smelter over its
6 expected life is the control case. Thus, I measure the economic impact by
7 measuring the difference between the control case and the “treated” case.

9 State GDP

10 **Q: Please describe the specific steps included in your computation of the**
11 **economic impact of the Noranda smelter in Missouri.**

12 A: As noted above, I looked at this question by comparing the expected path of
13 Missouri’s economy with the smelter and the expected path of Missouri’s economy
14 with the smelter shutdown. The first step is to determine the baseline, which is a
15 forecast of the path of Missouri’s Gross Domestic Products (GDP) for a twenty-five
16 year period assuming the Noranda smelter continues to operate. The second step
17 is to compute the path of Missouri’s GDP with the shutdown, thus taking the value
18 of the production at the Noranda smelter out of Missouri’s economy and starting a
19 new path.

20
21 **Q: How did you compute the baseline path—the expected path of Missouri’s**
22 **economy with the Noranda smelter?**

23 A: The baseline path is constructed using the average annual growth rate in
24 Missouri’s real GDP between 1997 and 2013. I focused on real GDP in order to

1 avoid having to forecast future movements in the inflation rate. The average
2 annual growth rate for Missouri's GDP is 1.08 percent. The Bureau of Economic
3 Analysis reports that Missouri's 2013 real GDP was \$258.135 billion. Here, real
4 GDP is measured as state GDP using a chain-weighted index in which the base
5 period is 2009. For each year between ** ____ ** and ** ____ **, I forecasted
6 Missouri's GDP by following the equation: $Y_t = 1.010837 * Y_{t-1}$, where Y is state
7 real GDP. I initialized this forecast with Missouri's 2013 GDP, that is, $Y_{2013} =$
8 \$258.135 billion.

9
10 **Q: What is the expected growth in Missouri GDP over twenty-five years with the**
11 **Noranda smelter?**

12 A: Using this formula, it is my conclusion that the Missouri GDP will grow from
13 \$258.135 billion in 2013 to \$293.779 billion in ** ____ ** and to \$345.332 billion in
14 ** ____ ** with the Noranda Smelter operations.

15
16 **Q: How did you compute the alternate path—the expected path of Missouri's**
17 **economy without the Noranda smelter?**

18 A: I constructed the alternate path by assuming that the value of aluminum production
19 at the Noranda Smelter is zero beginning in the second half of ** ____ ** (or
20 ** ____ ** and ** ____ **) because the smelter is shut down. In other words, the
21 economic value goes to zero for that smelter's contribution to Missouri's GDP for
22 one half of the calendar year in the case being analyzed. The Missouri economy,
23 therefore, starts from a lower GDP base in ** ____ ** and it takes time for those
24 resources to be re-employed. As with the baseline path, I used values taken from

1 2013 to initialize the economic impacts. Noranda reports that the value of
2 aluminum production at the New Madrid Smelter is \$152.142 million in the third
3 quarter of 2014. Over a year, the values of production at the New Madrid Smelter
4 is $\$152.142 * 4 = \608.568 . Following the *Ak* growth model, I computed the effect
5 that the decline in production would have on the Missouri economy. Here, the
6 value of *A* is calibrated to hit the average annual growth rate of the Missouri
7 economy; that is, $A = 0.8646$. The total annual change in the production is minus
8 \$608.568 million. By subtracting the one half of the production from the initial
9 value of Missouri real GDP, the treated value of Missouri's real GDP in ** ____ ** is
10 \$266.314 billion compared with \$266.619 billion in the baseline, or control setting.
11 I estimated the impact of the lost production on the final goods and services
12 produced in Missouri. In this case, with the loss of \$304.284 million in ** ____ **
13 and a full loss equal to \$608.568 million in ** ____ **, I compute the impact on the
14 Missouri economy for a period of either ten or 25 years. Because the lost
15 production does not affect the return to the remaining human and physical capital,
16 the *Ak* model economy does not recognize any decline in the state economy's
17 growth rate. Thus, I followed the same method to construct the path for Missouri's
18 GDP for the next twenty-five years; that is, $T+10$ and $T+25$, assuming the Noranda
19 smelter stopped production in 2016. By following this method, I computed the
20 revised Missouri GDP, $Y^*_{T+10} = \$293.111$ and $Y^*_{T+25} = \$344.548$ billion where *Y*
21 * denotes the revised level of Missouri GDP without the Noranda physical capital.
22 With sequence of values of Missouri GDP, the economic impact of the Noranda
23 smelter over the next ten or twenty-five years is the discounted sum of the
24 differences between projected Missouri GDP with Noranda's physical capital and

1 the projection in which Noranda's physical capital is omitted. This is expressed by
2 the following equation:

$$\sum_{t=T}^{T+25} \rho^{t-T} (Y_t - Y_t^*)$$

3
4 where ρ is the discount factor, or the rate at which one discounts the future levels
5 of Missouri GDP. Here, I use $\rho = 0.96$.

6
7 **Q: What is your conclusion concerning the expected growth in Missouri GDP
8 over twenty-five years without the Noranda smelter?**

9 A: Using this formula, it is my conclusion that the discounted sum of Missouri's
10 foregone GDP associated with Noranda's lost production over a generation is,
11 after discounting, computed to be \$10.08 billion over the 25 years starting in
12 **** ____ ****, to be \$9.4 billion over the 25 years starting in **** ____ ****, and to be \$8.76
13 billion over the 25 years starting in **** ____ ****. Over the ten years starting in **** ____ ****,
14 the loss in real GDP to the Missouri economy is \$4.8 billion; starting in **** ____ ****,
15 \$4.19 billion; and starting in **** ____ ****, \$3.6 billion. In other words, Missouri's
16 economy would forego something like \$9 billion in economic activity over a
17 generation if the Noranda smelter were closed.

18 19 **State and Local Tax Revenues**

20 **Q: How did you determine the impact of the closing of Noranda's smelter on
21 state tax revenues?**

22 A: Once the economic impact in terms of foregone state GDP is computed, it is
23 straightforward to compute the impact on Missouri's tax revenue. I looked at "net

1 general revenue” for the state which includes Missouri individual income taxes,
2 Missouri corporate income taxes, Missouri franchise taxes and other taxes paid to
3 the state general revenue fund (including some Missouri sales and use taxes).
4 Here, net refers to amounts collected after refunds. On average, Missouri’s net
5 general revenue fund receives 3.8 cents per dollar of amount of state GDP. I
6 multiplied 0.038 times the change in amount of state GDP to compute the
7 expected loss to state net general revenues over the next ten or twenty-five years
8 that would result from the closing of Noranda’s smelter.

9
10 **Q: What is your conclusion concerning the effect of the closing of the Noranda**
11 **smelter on state net general tax revenues over the next twenty-five years?**

12 A: My calculations indicate that Missouri state government would, at present value
13 over a generation, forego the collection of \$383 million over the 25 years starting in
14 ** ____ **, \$357.4 million over the 25 years starting in ** ____ **, and \$332.9 million
15 over the 25 years starting in ** ____ **. Over the ten years starting in ** ____ **, the
16 present value net general revenue impact from the New Madrid facility is \$182.6
17 million; starting in ** ____ **, \$159.1 million; and starting in ** ____ **, \$136.8 million.

18
19 **Q: What other tax collections would be affected by the closure of the Noranda**
20 **smelter?**

21 A: Noranda pays other state and local taxes as a result of the operation of the
22 smelter. I have calculated the impact of Noranda’s smelter closing on personal
23 property tax, real estate tax, and unemployment insurance tax.

1 **Q: How did you determine the impact of the closing of Noranda's smelter on**
2 **local property tax collections?**

3 A: Noranda reports that in 2014, it paid \$3.782 million in property taxes on tangible
4 personal property and real estate. This \$3.782 million is owed on the value of land,
5 machines and equipment held by Noranda in 2013. When the Noranda smelter
6 shuts down in ** ____ **, I assume the property taxes on unused land will go to zero.
7 Over time, I assume that the tax bill would have grown at the same rate as the
8 Missouri state GDP; that is, 1.08 percent. I applied this growth rate in the property
9 tax bill for the period ** ____ ** through ** ____ **. Thus, Noranda's ** ____ ** tax bill
10 would be \$3.906 million. I discounted the future tax liabilities at the same rate as I
11 did in the case of the foregone state GDP.

12

13 **Q: What is your conclusion concerning the effect of the closing of the Noranda**
14 **smelter on personal property tax collections over the next twenty-five**
15 **years?**

16 A: It is my conclusion that the discounted sum of future personal property taxes that
17 would not be paid by Noranda if the smelter were closed is equal to \$62.49 million
18 over the next twenty-five years. Over the next ten years, the discounted sum of
19 future personal property taxes would be \$28.82 million.

20

21 **Q: How would you summarize the effect of closing Noranda's New Madrid**
22 **Smelter on state and local tax collections?**

23 A: If the Noranda New Madrid Smelter were closed, there would be costs in the form
24 of foregone state GDP. Because the Missouri economy would shrink, there would

1 be fewer taxes collected by both state and local governments. I estimate that the
2 lost state and local revenues would be \$445.55 million over a generation. Over a
3 ten-year period, the loss is \$211.45 million. Schedule 1 summarizes the cost to the
4 state and local governments in the form of lost tax receipts.

6 Unemployment Insurance

7 **Q: What data did you rely on in determining the impact of the closing of**
8 **Noranda's smelter on Missouri unemployment insurance benefit payments?**

9 A: If the Noranda smelter were to close, there would be additional costs to Missouri
10 state government in the form of unemployment insurance claims made by workers
11 separated from work. The average unemployment duration is 9.5 weeks. Note
12 that 9.5 weeks is the unconditional average number of weeks that a person is
13 unemployed. In other words, the average duration is not conditional on the current
14 state of the aggregate United States' economy. According to data published by
15 the Bureau of Labor Statistics, the average duration of an unemployment spell is
16 33 weeks in November 2014. The median duration is 12.8 weeks. These data are
17 published at: <http://www.bls.gov/news.release/empst12.htm>. Missouri's
18 unemployment benefits are computed based on the worker's quarterly wages.
19 Specifically, a worker's weekly benefit amount (WBA) will be 4 percent of the
20 average of the worker's two highest quarters, but cannot be more than \$320.

21
22 **Q: What other facts did you rely on in determining the impact of the closing of**
23 **Noranda's smelter on Missouri unemployment insurance benefit payments?**

1 A: While I do not have data on the individual workers' salaries at Noranda, officials tell
2 me that the average total wage for hourly Noranda employees is \$60,000. Their
3 average quarterly wage is \$15,000. Weekly unemployment benefits in Missouri
4 are calculated as 4 percent of average quarterly salary or \$320, whichever is
5 smallest.

6

7 **Q: How did you determine the impact of the closing of Noranda's smelter on**
8 **Missouri unemployment insurance benefit payments to Noranda's**
9 **employees?**

10 A: There are 889 employees at the New Madrid Smelter eligible for unemployment
11 insurance benefits. Since 0.04 times \$15,000 is \$600, I assume that each of the
12 889 employees at the Noranda smelter in New Madrid, Missouri would receive
13 weekly benefits equal to \$320. I then applied the median number of weeks of
14 benefits, and found that expected weekly unemployment insurance benefits paid
15 to these workers would be \$3,641,344. If I used the sample mean duration instead
16 of the median duration, the expected unemployment insurance benefits would be
17 \$9,387,840.

18

19

Summary

20 **Q: How would you summarize your conclusions concerning the impact of the**
21 **closing of Noranda's smelter on the Missouri economy?**

22 A: I have applied standard economic theory to compute the effect that eliminating
23 Noranda's New Madrid Smelter would have on the Missouri economy. The impact
24 to the Missouri economy from the shutdown and closure is significant. I treated the

1 case in which the physical capital employed by Noranda vanishes. For the
2 twenty-five year period after the smelter stops operating and vanishes, the
3 discounted sum of lost state GDP is \$10.08 billion. Over a ten-year period, the
4 discounted sum of lost state GDP is \$4.806 billion. In addition, state and local
5 government revenues are not paid. The discounted sum of lost net general
6 revenue paid to the state is \$383.06 million over the twenty-five year period.
7 Between ** ____ ** and ** ____ **, the discounted sum of lost net general revenue is
8 \$182.63 million. Personal property taxes plus real estate taxes would also be
9 reduced by \$62.49 million over the period ** ____ ** - ** ____ **. If we focus on the
10 period ** ____ ** through ** ____ **, the discounted sum of personal property taxes
11 would decline by \$28.82 million without Noranda operating. Finally, the state
12 would incur costs as a result of the payment of unemployment insurance benefits.
13 Based on the median duration for unemployment spells during the current
14 business cycle, the state would expect to pay nearly \$3.6 million in unemployment
15 insurance benefits if the smelter were shutdown. If, however, the smelter
16 shutdown occurred and one uses the sample mean duration for the unemployment
17 spell based on the current business cycle, the state would expect to pay over \$9.4
18 million in unemployment insurance benefits. Schedule 1 summarizes the cost to
19 the state and local governments in the form of lost tax receipts.

20
21
22
23
24

1

Schedule 1

Tax Category	Present value summed over 25 year period	Present value summed over 10 year period
Net General Revenue foregone	\$383.06 million	\$182.63 million
Local Property Tax (not collected)	\$62.49 million	\$28.82 million

2

3

4

5

6

Schedule 2 summarizes the total unemployment insurance bill for both hourly and salaried Missouri residents for each of the three alternative expected-duration assumptions.

Schedule 2

Employee category	Unconditional Mean unemployment duration = 9.5 weeks	Median unemployment duration = 12.8 weeks	Cyclically-adjusted Mean unemployment duration = 33 weeks
Complete Shutdown	\$2,702,560	\$3,641,344	\$9,387,840

7

8

9

Q: Does this conclude your testimony?

10

A: Yes.

CURRICULUM VITA

JOSEPH H. HASLAG

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University of Missouri-Columbia
Columbia, MO 65211

PERSONAL DATA: Date of Birth: March 28, 1961
Marital Status: Married (Sara)
Citizenship: United States

EDUCATION: Ph.D., Economics, Southern Methodist University, Dallas, TX, 1987.
M.A., Economics, University of Missouri-Columbia, Columbia, MO, 1984.
B.S., University of Missouri-Columbia, Columbia, MO, 1982.

AWARDS
Who's Who in America, 2008-

AREAS OF SPECIALIZATION:
Monetary Theory
Growth and Development
Financial Institutions
Macroeconomic Theory

PROFESSIONAL EXPERIENCE:
Professor and Kenneth Lay Chair in Economics, Department of Economics, University of Missouri, February 2008 -
Professor of Economics, Department of Economics, University of Missouri-Columbia, September 2006-January 2008
Associate Professor of Economics, Department of Economics, University of Missouri-Columbia, 2000-2006
Executive Director, Economic Planning and Research Center, University of Missouri-Columbia, June 2002 – Present
Visiting Scholar, Federal Reserve Bank of Kansas City, 2001-03.
Visiting Scholar, Federal Reserve Bank of Atlanta, Fall 2000.
Visiting Scholar, Federal Reserve Bank of Cleveland, Fall 2008.
Visiting Scholar, Federal Reserve Bank of St. Louis, Fall 2010.
Visiting Professor of Economics, Michigan State University, Spring 2000.
Senior Economist and Policy Advisor, Research Department, Federal Reserve Bank of Dallas, December 1995 to August 2000.
Visiting Professor of Economics, Southern Methodist University, January 1989, to December 1998.
Visiting Scholar, Erasmus University, Rotterdam, The Netherlands, June 1991.
Senior Economist, Research Department, Federal Reserve Bank of Dallas, September 1990 to November 1995.

Economist, Research Department, Federal Reserve Bank of Dallas, January 1988 to August 1990.

Economist, Research and Public Affairs Department, Federal Reserve Bank of St. Louis, July 1987 to January 1988.

Adjunct Assistant Professor of Finance, University of Missouri-St. Louis, September 1987 to January 1988.

Instructor, Department of Economics, Southern Methodist University, August 1986 to May 1987.

Instructor, Department of Economics, University of Texas-Arlington, August 1986 to May 1987.

PUBLISHED PAPERS:

- 1) “Government Policy under Price Uncertainty: A Source of Volatility in Illegal Immigration” (joint with Mark Guzman and Pia Orrenius), *Canadian Journal of Economics*, forthcoming
- 2) “Unconventional Optimal Open Market Purchases,” (joint with Chao Gu), *Review of Economic Dynamics*, forthcoming
- 3) “Production, hidden action, and the payment system,” (joint with Chao Gu and Mark Guzman), *Journal of Monetary Economics*, March 2011, 58(2), 172-182.
- 4) “Why does overnight liquidity cost more than intraday liquidity,” (joint with Joydeep Bhattacharya and Antoine Martin), *Journal of Economic Dynamics and Control*, June 2009, 33(6), 1236-46.
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- 6) “Who is afraid of the Friedman Rule?” (joint with Joydeep Bhattacharya, Antoine Martin and Rajesh Singh), *Economic Inquiry*, April 2008, 46(2), 113-30.
- 7) “Understanding the cost difference between intraday and overnight liquidity,” *Journal of Financial Transformation*, 2008, 24, 105-07.
- 8) “On the determinants of optimal border enforcement,” (joint with Mark Guzman and Pia Orrenius), *Economic Theory*, February 2008, 34(2), 261-96.
- 9) “Optimality of the Friedman Rule in an overlapping generations model with spatial separation,” *Journal of Money, Credit, and Banking*, October 2007, 39(7), 1741-1758.
- 10) “On Money and Output: Is Money Redundant?” (joint with Rik Hafer and Garret Jones), *Journal of Monetary Economics*, April 2007, 54(3), 945-54.
- 11) “Suboptimality of the Friedman Rule in Townsend’s turnpike and Stochastic Relocation Models of Money: Do Finite Lives and Initial Dates Matter?” (joint with Joydeep Bhattacharya and Antoine Martin), *Journal of Economic Dynamics and Control*, May 2006, 30(5), 879-97.

- 12) "Heterogeneity, Redistribution and the Friedman Rule," (joint with Joydeep Bhattacharya and Antoine Martin), *International Economic Review*, May 2005, pp. 437-454.
- 13) "The Role Of Money in Two Alternative Models: When is the Friedman Rule Optimal, and Why?" (joint with Joydeep Bhattacharya and Steven Russell), *Journal of Monetary Economics*, November, 2005.
- 14) "The Non-Monotonic Relationship between Seigniorage and Inequality," (joint with Joydeep Bhattacharya and Helle Bunzel), *Canadian Journal of Economics*, May 2005, 500-19.
- 15) "Crony Capitalism and Financial System Stability" (joint with Rowena Pecchenino), *Economic Inquiry*, January 2005, pp. 24-38.
- 16) "Is Reserve Requirement Arithmetic More Pleasant?" (with Joydeep Bhattacharya), *Economica*, August 2003, pp. 271-91.
- 17) "Monetary Policy, Fiscal Policy, and the Inflation Tax: Equivalence Results," (with J. Bhattacharya and S. Russell), *Macroeconomic Dynamics*, 7, October 2003, pp. 647-69.
- 18) "On the Use of the Inflation Tax when Non-Distortionary Taxes are Available," (with Joydeep Bhattacharya) *Review of Economic Dynamics*, 4(4), October 2001, pp. 823-41.
- 19) "Reliance, Composition, and Inflation," *Economic & Financial Review*, Federal Reserve Bank of Dallas, First Quarter 2001, pp. 20-28.
- 20) "Monetary Policy Arithmetic: Some Recent Contributions," *Economic & Financial Review*, Federal Reserve Bank of Dallas, (with Joydeep Bhattacharya), Third Quarter 1999, pp. 26-36, [cited in "Recommendations for Further Reading, *Journal Of Economic Perspectives* 14(2), Spring 2000].
- 21) "Money Creation, Reserve Requirements, and Seigniorage," (with Eric Young) *Review of Economic Dynamics*, Issue 3, 1998, pp. 677-98.
- 22) "Seigniorage Revenue and Monetary Policy: Some Preliminary Evidence," *Economic Review*, Federal Reserve Bank of Dallas, 3rd Quarter 1998, pp. 10-20.
- 23) "Monetary Policy, Banking, and Growth," *Economic Inquiry*, 36(3), 1998, pp. 489-500.
- 24) "Output, Growth, Welfare, and Inflation: A Survey," *Economic Review*, Federal Reserve Bank of Dallas, 2nd Quarter, 1997, pp. 11-21, [cited in "Recommendations for Further Reading, *Journal of Economic Perspectives*, 1998].
- 25) "On the Optimality of Interest-Bearing Reserves in Economies of Overlapping Generations," (with Scott Freeman) *Economic Theory*, 7, 1996, pp. 557-65.
- 26) "Implementing Monetary Base Rules: The Currency Problem," (with R.W. Hafer and Scott Hein) *Journal of Economics and Business*, 1996, pp. 461-72.

- 27) "Should Bank Reserves Pay Interest?" (with Scott Freeman), *Economic Review*, Federal Reserve Bank of Dallas, Fourth Quarter, 1995, pp. 25-33.
- 28) "Measuring the Policy Effects of Changes in Reserve Requirements," (with Scott E. Hein), *Economic Review*, Federal Reserve Bank of Dallas, Third Quarter, 1995, pp. 2-15.
- 29) "Does It Matter How Monetary Policy Is Implemented?" (with Scott Hein), *Journal of Monetary Economics*, 35(May) 1995, pp. 359-86.
- 30) "Quasi-Balance Sheet Measures of U.S. Monetary Policy: A Closer Look," (with Scott E. Hein) *Journal of Money, Credit, and Banking*, February 1995, pp. 124-39.
- 31) "Cyclical Fluctuations, Macroeconomic Policy and the Size Distribution of Income: Some Preliminary Evidence," (with D. J. Slottje) *Journal of Income Distribution*, Spring 1995 pp. 3-23.
- 32) "Monetary Policy and Recent Business-Cycle Experience," (with R.W. Hafer and Scott E. Hein), *Economic Review*, Federal Reserve Bank of Dallas, Third Quarter 1994, pp. 14-28.
- 33) "Are Net Discount Ratios Stationary: Some Further Evidence," (with Michael Nieswiadomy and D. J. Slottje) *Journal of Risk and Insurance*, 61(3), 1994, pp. 513-18.
- 34) "A Longer Look at Developments in the Distribution of Income," (with Lori L. Taylor), *Economic Review*, Federal Reserve Bank of Dallas, First Quarter 1993, pp. 19-30.
- 35) "Macroeconomic Activity and Monetary Policy Actions: Some Preliminary Evidence," (with Scott E. Hein) *Journal of Money, Credit, and Banking*, November 1992, pp. 431-46.
- 36) "A Theory of Fed Watching in a Macroeconomic Policy Game," (with Nathan S. Balke) *International Economic Review*, August 1992, pp. 619-28.
- 37) "Are Net Discount Rate Stationary?: The Implications for Present Value Calculations," (with Michael Nieswiadomy and S. J. Slottje) *Journal of Risk and Insurance*, September 1991, pp. 507-12.
- 38) "Variability and Forecastability of Central Bank Preferences in a Monetary Policy Game," (with Nathan S. Balke) *Journal of Macroeconomics*, Summer 1991, pp. 535-41.
- 39) "Money Growth, Supply Shocks, and Inflation," (with D'Ann M. Ozment) *Economic Review*, Federal Reserve Bank of Dallas, May 1991, pp. 1-17.
- 40) "Economic Activity and Two Monetary Base Measures," (with Scott E. Hein) *Review of Economics and Statistics*, November 1990, pp. 672-76.
- 41) "Monetary Aggregates and the Rate of Inflation," *Economic Review*, Federal Reserve Bank of Dallas, March 1990, pp. 1-12.
- 42) "Federal Reserve System Reserve Requirements: 1959-88," (with Scott E. Hein) *Journal of Money, Credit, and Banking*, November 1989, pp. 515-23.

- 43) "Reserve Requirements, the Monetary Base and Economic Activity," (with Scott E. Hein), *Economic Review*, Federal Reserve Bank of Dallas, March 1989, pp. 1-15, [reprinted in Readings to accompany The Economics of Money, Banking, and Financial Markets, James W. Eaton and Frederic S. Mishkin, ed. and Readings on Financial Institutions and Markets, Donald R. Fraser and Peter S. Rose, ed.]
- 44) "A Study of the Relationship Between Economic Growth and Inequality: The Case of Mexico," (with Thomas B. Fomby and D. J. Slottje), *Economic Review*, Federal Reserve Bank of Dallas, May 1988, pp. 13-25.
- 45) "The FOMC in 1987: The Effects of a Falling Dollar and the Stock Market Crash," (with R. W. Hafer), *Review*, Federal Reserve Bank of St. Louis, March/April 1988, pp. 3-16.
- 46) "The Market Value of Government of Canada Debt, Monthly, 1937-84," (with W. Michael Cox) *Canadian Journal of Economics*, August 1986, pp. 469-97.
- 47) "A Sensitivity Analysis of the Effect of Fiscal and Monetary Policy on the Size Distribution in the U.S.," (with William R. Russell and S. J. Slottje) *Advances in Econometrics*, George F. Rhodes, ed., 1986, pp. 97-142.

CURRENT WORK:

"Money and Coordination Failure: a New Look" (joint with Jim Dolmas)

"The Cyclical Behavior of the Price Level and Inflation: A Probabilistic Approach (joint with William A. Brock)

SHORT ARTICLES:

"Grading Tips: An I for Incomplete," *The Southwest Economy*, Issue 5, 1998.

"Honest Money is the Best Policy," *The Southwest Economy*, Issue 3, 1996 (reprinted in the Durell Journal of Money and Banking).

"U.S. Economic Forecast Calls for Slightly Slower Growth," *The Southwest Economy*, Issue 5, 1994.

"The U.S. Economy: A Brighter Outlook after a Bumpy Ride," (with Harvey Rosenblum) *The Southwest Economy*, March/April 1993.

"The Haves and the Haves-Nots: A Study of Income Inequality," (with Lori L. Taylor and Kelly Whealan) *The Southwest Economy*, September 1992.

"Trends in Income Mobility," (with Lori L. Taylor and Kelly Whealan) *The Southwest Economy*, September 1992.

BOOKS:

Modelling Monetary Economies, 3rd ed. Cambridge, U.K.: Cambridge University Press, 2011 (with Bruce A. Champ and Scott Freeman).

Macroeconomic Activity and Income Inequality in the United States, Greenwich, CT: JAI Press, 1989 (with W.R. Russell and D.J. Slottje).

REPORTS:

“What makes a good tax structure,” joint with Haleigh Albers (Show-Me Institute Essay)

“Slip Sliding Away: The Weak Relative Growth of the Missouri Economy” joint with Mikchael Podgursky (Show-Me Institute essay)

“Income taxes vs. Sales taxes: A welfare comparison” joint with Grant Casteel (Show-Me Institute Essay)

“Unleashing video competition: The benefits of cable franchise reform to Missouri consumers,” Show-Me Institute No. 8, February, 2007.

“How to replace the earnings tax in Kansas City,” Show-Me Institute No.6 , January 2007.

“How to replace the earnings tax in St. Louis,” Show-Me Institute No.5 , January 2007.

“How an earnings tax harms cities like St. Louis and Kansas City” Show-Me Institute No.1, April 2006.

“The Economic Impact of the School of Health Professions at the University of Missouri-Columbia”

“The Economic Impact of the New Basketball Arena at the University of Missouri-Columbia”

"Toward the Identification of Adult Training Program Opportunities" (with D. W. Stevens and R. L. McHugh).

"Using Available Data to Target Re-Training Allocations in Missouri" (with D. W. Stevens).

GRANTS:

Missouri Technology Corporation, \$25,000, Spring 2005.

International Travel Grant, University of Missouri-Columbia, \$1500, Summer 2001.

STUDENTS:

Martin Peyera—chair dissertation (2008)

Ok-Sun Seo—chair dissertation (2006)

Jaepil Park—chair dissertation (2004)

Varavuth Chintarajeda—chair dissertation (2004)

Chao Gu—chair master’s thesis (2002)

Dean Crader—chair master’s thesis (2003)

Brian Banner—chair master’s thesis (2004)

PAPERS PRESENTED (last five years):

“Unconventional optimal open market purchases,” Federal Reserve Bank of Chicago Money Workshop (August 2012), Missouri Economics Conference (March 2012), University of Kansas (September 2013)

“Money and Coordination Failure: A New Look,” University of Alabama (October 2013)

“Production, hidden action, and the payment system,” Midwest Macro meetings (May 2008), Texas A&M (Oct. 2008), SMU (Oct 2008), Federal Reserve Bank of Dallas (Oct 2008), Federal Reserve Bank of Cleveland (Nov. 2009), Federal Reserve Bank of St. Louis (Dec 2010).

PROFESSIONAL MEMBERSHIPS:

American Economic Association
Econometric Society
Society of Economics Dynamics

REFEREE FOR:

American Economic Review, Journal of Monetary Economics, International Economic Review, Review of Economic Dynamics, Review of Economics and Statistics, European Economic Review, Economic Theory, Economic Inquiry, Journal of Money, Credit, and Banking, Review of International Economics, Southern Economic Journal, Journal of Macroeconomics, Journal of Economic Behavior and Organization, Journal of Income Distribution

Associate Editor, *Economic Inquiry* from 2003-2008.

COURSES TAUGHT:

Macroeconomic Theory (Core Graduate, both semesters)
Monetary Theory (Graduate)
Monetary Theory and Policy (advanced undergraduate)
Macroeconomic Theory and Policy (advanced undergraduate level)
Intermediate Microeconomics
Intermediate Macroeconomics
Money and Banking
Principles (Micro and Macro)
(evaluations available upon request)

DEPARTMENT & UNIVERSITY SERVICE:

Organized Missouri Economics Conference in 2001, 2004, 2006, 2010, 2011, 2012; local coordinator in 2001-2012.

Organized Texas Monetary Conference in 1994 and 1999.

University of Missouri System Benefits Committee, 2004-2011

University of Missouri Academic Grievance Committee, member 2003-

Lectureship in American Traditions and Values Committee, member 2003-2004

Member, Provost Committee for Economic Development, Human Resources and Public Policy Committees, 2006-2010.

OPINION ARTICLES:

--published numerous opinion articles in the Kansas City Star, St. Louis Post Dispatch, St. Louis Beacon, Springfield News Leader, and Columbia Tribune.

--resident economics commentator for Columbia Business Times, 2010-2012

REFERENCES:

References available upon request