BEI_Operating_Expenses

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Import Libraries

```
library(tidyverse)
```

```
## Warning: package 'tidyverse' was built under R version 4.0.2
```

```
## -- Attaching packages --------------------------------------------------- tidyverse 1.3.0 --
```

```
## v ggplot2 3.3.2     v purrr   0.3.4
## v tibble  3.0.1     v dplyr   1.0.0
## v tidyr   1.1.0     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.5.0
```

```
## Warning: package 'ggplot2' was built under R version 4.0.2
```

```
## Warning: package 'tibble' was built under R version 4.0.2
```

```
## Warning: package 'tidyr' was built under R version 4.0.2
```

```
## Warning: package 'readr' was built under R version 4.0.2
```

```
## Warning: package 'purrr' was built under R version 4.0.2
```

```
## Warning: package 'stringr' was built under R version 4.0.2
```

```
## Warning: package 'forcats' was built under R version 4.0.2
```

```
## -- Conflicts ------------------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(ggplot2)
#install.packages('DT')
library(DT)
```

```
## Warning: package 'DT' was built under R version 4.0.5
```

EXPENSES

Import and Clean Data

```
expense <- read.csv("BEI_Operating_Expenses.csv", header = TRUE)
summary(expense)
```

```
##  Meta_Category_Number Meta_Category_Name Category_Number Category_Name
##  Min.   :60001        Length:273         Min.   :60000   Length:273
##  1st Qu.:64001        Class :character   1st Qu.:64500   Class :character
##  Median :67000        Mode  :character   Median :67400   Mode  :character
##  Mean   :67755                           Mean   :67935
##  3rd Qu.:70011                           3rd Qu.:70100
##  Max.   :79001                           Max.   :79000
##     Month               Amount
##  Length:273         Min.   : -2813.75
##  Class :character   1st Qu.:     0.00
##  Mode  :character   Median :    68.26
##                     Mean   :  4067.70
##                     3rd Qu.:  1292.11
##                     Max.   :161999.00
```

```
#View(expense)

#remove the meta-categories(?)

#change column categories
expense$Meta_Category_Name = as.factor(expense$Meta_Category_Name)
expense$Meta_Category_Number = as.factor(expense$Meta_Category_Number)
expense$Category_Name = as.factor(expense$Category_Name)
expense$Category_Number = as.factor(expense$Category_Number)
expense$Month = as.factor(expense$Month)
#expense$Amount = as.numeric(as.factor(expense$Amount))

summary(expense)
```

```
##  Meta_Category_Number         Meta_Category_Name Category_Number
##  66000  : 28          Repairs          : 28      60000  :  7
##  67000  : 28          Supplies         : 28      60600  :  7
##  64001  : 21          Payroll          : 21      61000  :  7
##  65000  : 21          Professional Fees: 21      61300  :  7
##  69200  : 21          Utilities        : 21      62100  :  7
##  60001  : 14          Fees             : 14      62150  :  7
##  (Other):140          (Other)          :140      (Other):231
##               Category_Name      Month        Amount
##  Accounting          :  7   April    :39   Min.   : -2813.75
##  Bank Service Charges:  7   February:39   1st Qu.:     0.00
##  Bedding             :  7   January :39   Median :    68.26
##  Building Repairs    :  7   July    :39   Mean   :  4067.70
##  Business Insurance  :  7   June    :39   3rd Qu.:  1292.11
##  Contracted Services :  7   March   :39   Max.   :161999.00
##  (Other)             :231   May     :39
```

```
View(expense)
```

#View the full table by month

```
#summary by month
expense_summary <- expense %>% group_by(Category_Name, Category_Number, Month) %>%
                                  summarise(Cost = sum(Amount))
```

```
## `summarise()` regrouping output by 'Category_Name', 'Category_Number' (override with `.groups` argume
```

```
wide_expense <- pivot_wider(expense_summary,
                            names_from = Month,
                            values_from = Cost)

#View(wide_expense)

wide_expense[c("Category_Name", "January", "February", "March", "April", "May ", "June ", "July")]
```

```
## # A tibble: 39 x 8
## # Groups:   Category_Name [39]
##    Category_Name        January February    March    April `May ` `June `   July
##    <fct>                  <dbl>    <dbl>    <dbl>    <dbl>  <dbl>   <dbl>  <dbl>
##  1 Accounting             215.       0    1190     3685    0.       150   3.15e2
##  2 Bank Service Charges    88.9      3.5     3.5      3.5  3.50e0     3.5 3.50e0
##  3 Bedding                  0    -2814.   4172.     281.   7.81e2     0   0.
##  4 Building Repairs         0        0   11330.     304    1.88e2     0   0.
##  5 Business Insurance   13182.     348.      0    11730.   0.         0   1.23e4
##  6 Contracted Services   2529     1554    1800     3128    4.20e3  3684   2.58e3
##  7 Dues and Subscripti~   250        0       2.13     2.13 2.13e0     0   0.
##  8 Electricity LES       2383.    2560.   4674.    1265.   2.83e3  3492.  5.26e3
##  9 Electricity Norris    1699.    2327.   1910.    2439    4.90e3  2286   2.36e3
## 10 Equipment Rental         0        0       0        0    0.         0   2.05e2
## # ... with 29 more rows
```

```
#summary by category
expense_cat <- expense %>% group_by(Category_Name) %>%
                              summarise(Total = sum(Amount))
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
#View(expense_cat)


#Join expense_cat and wide_expense
Expense_Summary_1 <- full_join(wide_expense, expense_cat)
```

```
## Joining, by = "Category_Name"
```

Make a datatable

```r
expense_table <- datatable(Expense_Summary_1, rownames = FALSE, class = 'cell-border stripe')

DT::saveWidget(expense_table, "expense_table.html")
```

Summarize Data using meta-categories

“‘{ r } Meta_Expense_Summary <- expense %>% group_by(Meta_Category_Name, Month, Meta_Category_Number) %>% summarise(cost = sum(Amount))

View(Meta_Expense_Summary)

wide_meta_expense <- pivot_wider(Meta_Expense_Summary, names_from = Month, values_from = cost)

wide_meta_expense[c(“Meta_Category_Name”, “January”, “February”, “March”, “April”, “May”, “June”, “July”)]

#summary by category meta_expense_cat <- expense %>% group_by(Meta_Category_Name) %>% summarise(Total = sum(Amount))

#Join expense_cat and wide_expense Meta_Expense_Summary_1 <- full_join(wide_meta_expense, meta_expense_cat)

Make a datatable
‘‘‘{ r}

```r
meta_summary_table <- datatable(Meta_Expense_Summary_1, rownames = FALSE, class = 'cell-border stripe')

DT::saveWidget(meta_summary_table, "meta_summary_table.html")
```

Group by Month

```r
#summary by month
month_expense_summary <- expense %>% group_by(Month) %>%
                                  summarise(Cost = sum(Amount))
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```r
wide_month_expense <- pivot_wider(month_expense_summary,
                            names_from = Month,
                            values_from = Cost)

#View(month_expense_summary)

wide_month_expense$Category_Name = "Month_total"
wide_month_expense$Category_Number = "00000"
wide_month_expense$Total = sum(month_expense_summary$Cost)


wide_month_expense <- wide_month_expense[c("Category_Name", "Category_Number", "January", "February", "

View(wide_month_expense)
```

```
#summary by category
#expense_cat <- expense %>% group_by(Category_Name) %>%
#                            summarise(Total = sum(Amount))

#View(expense_cat)


#Join expense_cat and wide_expense
Month_Expense_Summary_1 <- full_join(wide_month_expense, Expense_Summary_1)
```

```
## Joining, by = c("Category_Name", "Category_Number", "January", "February", "March", "April", "May ",
```

Make a datatable

```
month_expense_table <- datatable(Month_Expense_Summary_1, rownames = FALSE, class = 'cell-border stripe

DT::saveWidget(month_expense_table, "month_expense_table.html")
```

View the average, min, med, and max operating expenses by month

```
average_table <- expense %>% group_by(Category_Name) %>%
                        summarise(min = min(Amount),
                                  average = round(mean(Amount), digits=2),
                                  sd = round(sd(Amount), digits=2),
                                  med = median(Amount),
                                  max = max(Amount))
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
average_table
```

```
## # A tibble: 39 x 6
##    Category_Name              min average     sd     med     max
##    <fct>                    <dbl>   <dbl>  <dbl>   <dbl>   <dbl>
##  1 Accounting                 0     794.  1339.   215.    3685
##  2 Bank Service Charges       3.5    15.7   32.3    3.5     88.9
##  3 Bedding                -2814.    346.  2049.     0     4172.
##  4 Building Repairs           0    1689.  4253.     0    11330.
##  5 Business Insurance         0    5362.  6594.   348.   13182.
##  6 Contracted Services     1554    2782.   959.  2580.    4200
##  7 Dues and Subscriptions     0      36.6   94.1    2.13   250
##  8 Electricity LES         1265.   3209.  1381.  2832.    5257.
##  9 Electricity Norris      1699.   2560.  1068.  2327.    4903
## 10 Equipment Rental           0      29.4   77.6    0      205.
## # ... with 29 more rows
```

```
# make a standard error column

average_table$se = round(average_table$sd/(sqrt(7)), digits=2)

average_table
```

```
## # A tibble: 39 x 7
##    Category_Name              min average     sd     med     max     se
##    <fct>                    <dbl>   <dbl>  <dbl>   <dbl>   <dbl>  <dbl>
##  1 Accounting                 0     794.  1339.   215.    3685    506.
##  2 Bank Service Charges       3.5    15.7   32.3    3.5     88.9   12.2
##  3 Bedding                -2814.    346.  2049.     0     4172.   774.
##  4 Building Repairs           0    1689.  4253.     0    11330.  1607.
##  5 Business Insurance         0    5362.  6594.   348.   13182.  2492.
##  6 Contracted Services     1554    2782.   959.  2580.    4200    363.
##  7 Dues and Subscriptions     0      36.6   94.1    2.13   250     35.6
##  8 Electricity LES         1265.   3209.  1381.  2832.    5257.   522
##  9 Electricity Norris      1699.   2560.  1068.  2327.    4903    404.
## 10 Equipment Rental           0      29.4   77.6    0      205.    29.4
## # ... with 29 more rows
```

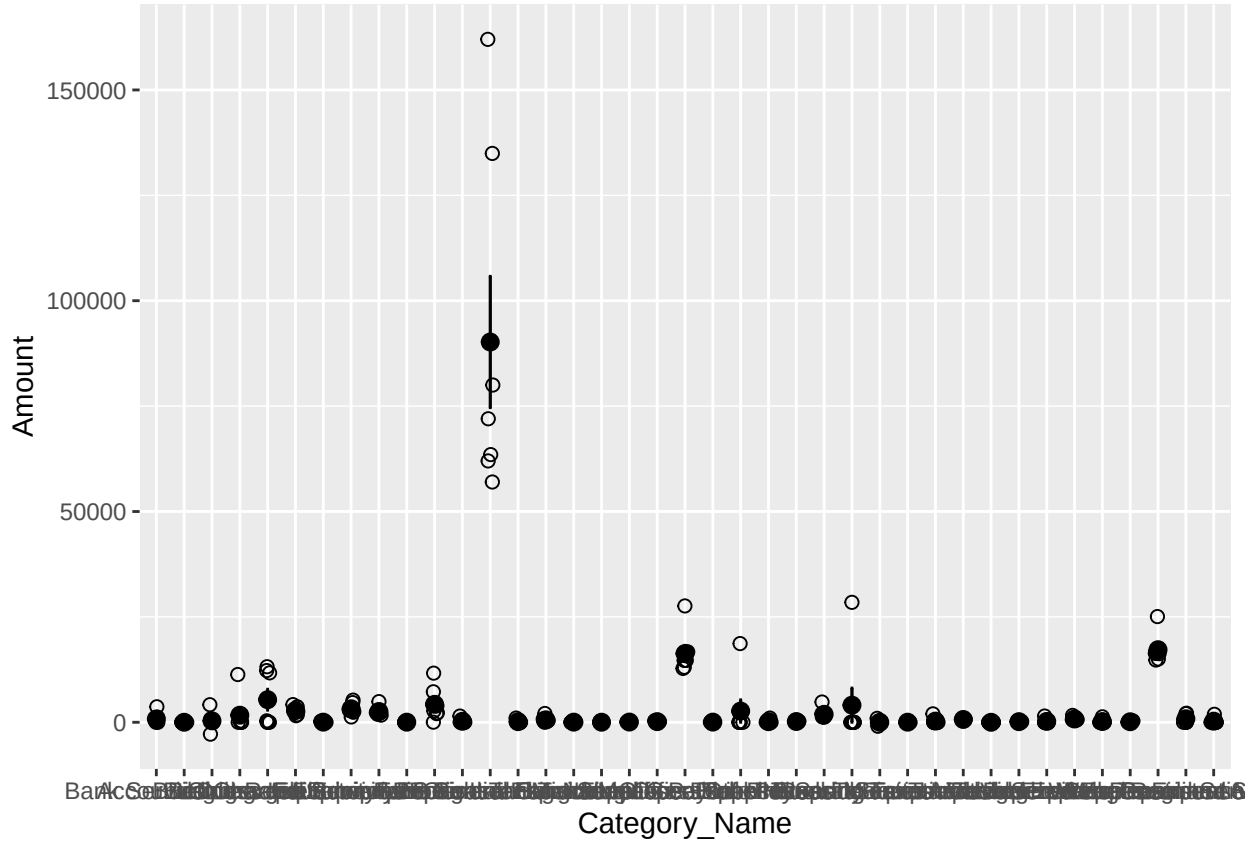
```
average_table <- average_table[c("Category_Name", "min", "average", "sd", "se", "med", "max")]
```

Make a datatable

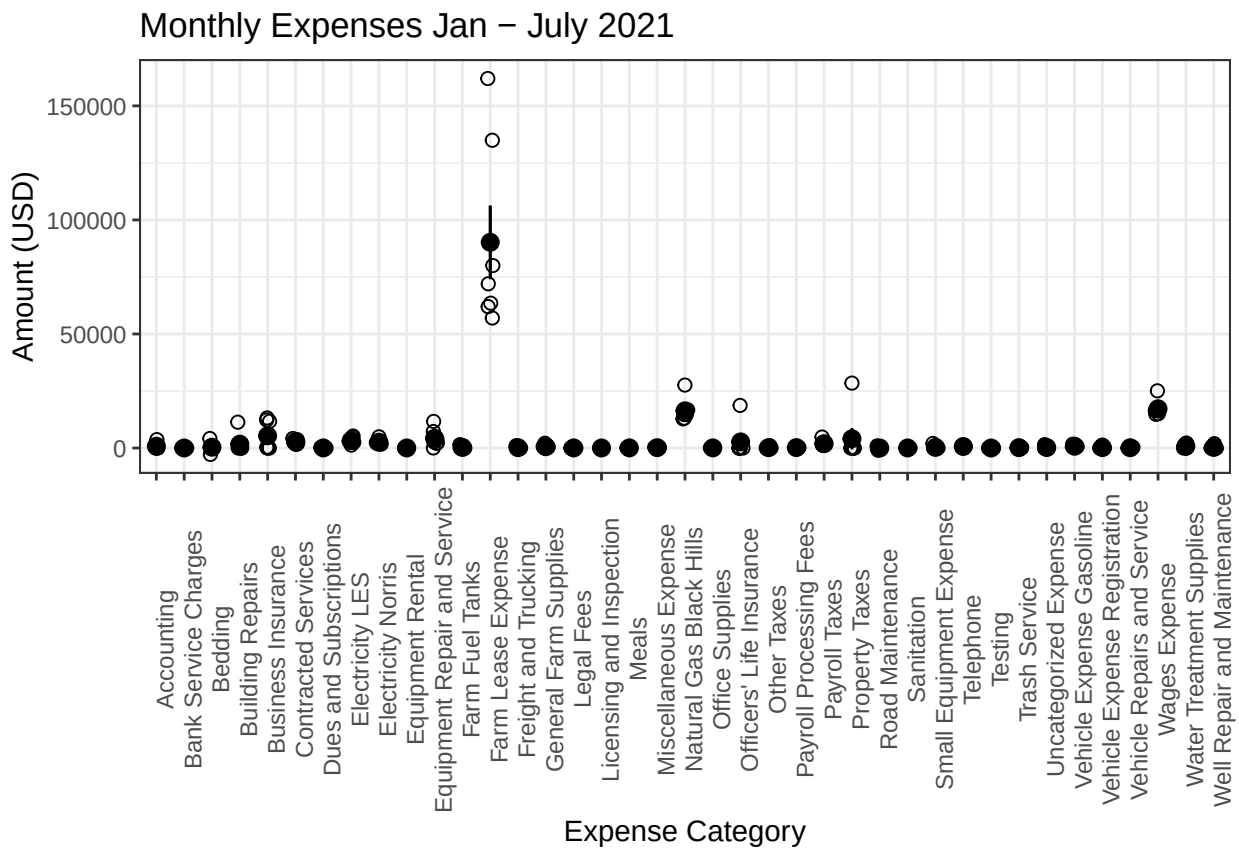
```
avg_expense_table <- datatable(average_table, rownames = FALSE, class = 'cell-border stripe')

DT::saveWidget(avg_expense_table, "avg_expense_table.html")
```

Make a graph of expenses

```
expense_plot <- ggplot(expense, aes(x=Category_Name, y=Amount)) +
  geom_point(cex = 2, pch = 1.0,position = position_jitter(w = 0.1, h = 0)) +
  stat_summary(fun.data = 'mean_se', geom = 'errorbar', width = 0.1) +
  stat_summary(fun.data = 'mean_se', geom = 'pointrange') +
  geom_point(data = average_table, aes(x = Category_Name, y = average))

expense_plot
```




```
all_expenses_plot <-
  expense_plot +
  theme_bw() +
  theme(axis.text.x = element_text(angle = 90)) +
  labs(title = "Monthly Expenses Jan - July 2021",
       x = "Expense Category",
       y = "Amount (USD)")
all_expenses_plot
```




```
ggsave(all_expenses_plot, file = "all_expenses.png")
```

```
## Saving 6.5 x 4.5 in image
```

Do the graph again, minus the farm lease expense

```
expense$Category_Name
```

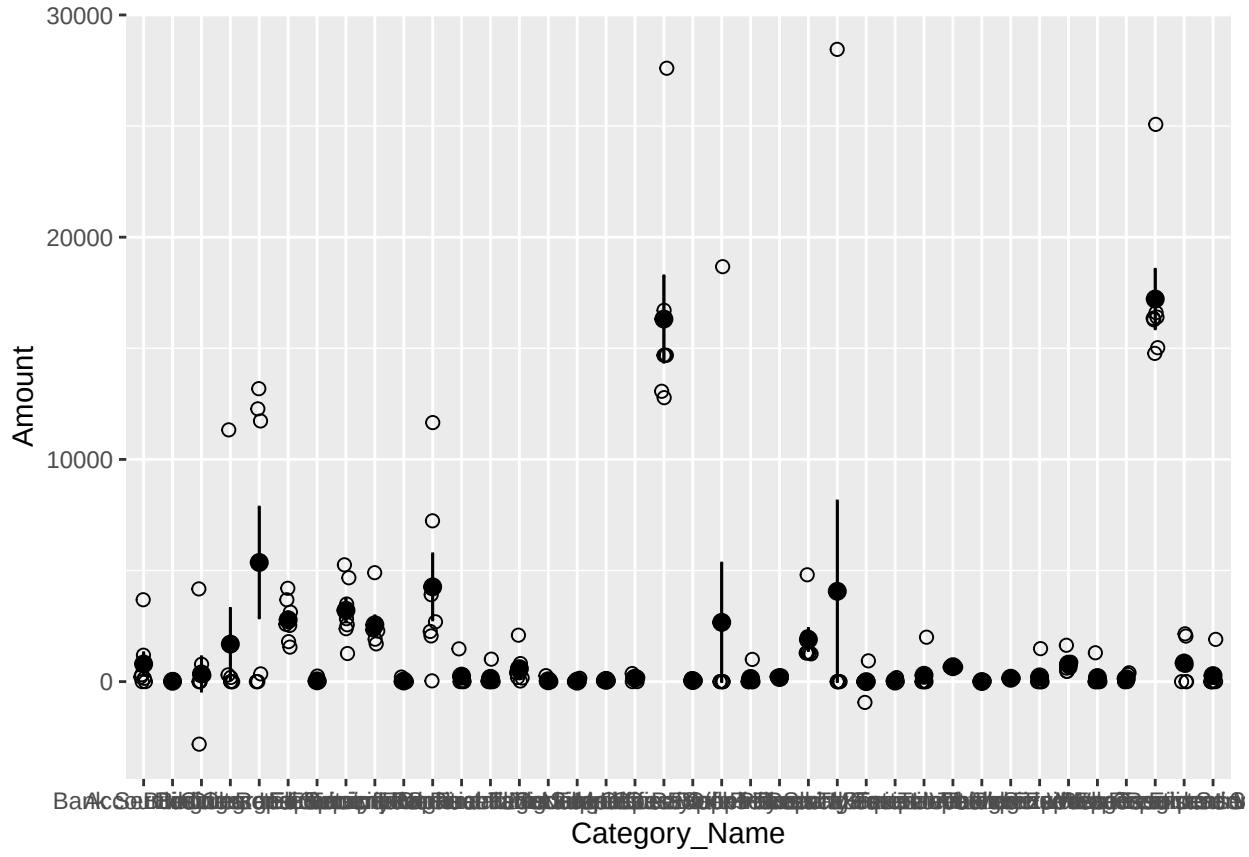
```
##   [1] Bank Service Charges         Bank Service Charges
##   [3] Bank Service Charges         Bank Service Charges
##   [5] Bank Service Charges         Bank Service Charges
##   [7] Bank Service Charges         Dues and Subscriptions
##   [9] Dues and Subscriptions       Dues and Subscriptions
##  [11] Dues and Subscriptions       Dues and Subscriptions
##  [13] Dues and Subscriptions       Dues and Subscriptions
##  [15] Equipment Rental             Equipment Rental
##  [17] Equipment Rental             Equipment Rental
##  [19] Equipment Rental             Equipment Rental
##  [21] Equipment Rental             Freight and Trucking
##  [23] Freight and Trucking         Freight and Trucking
##  [25] Freight and Trucking         Freight and Trucking
##  [27] Freight and Trucking         Freight and Trucking
##  [29] Business Insurance           Business Insurance
```

```
##  [31] Business Insurance           Business Insurance
##  [33] Business Insurance           Business Insurance
##  [35] Business Insurance           Officers' Life Insurance
##  [37] Officers' Life Insurance     Officers' Life Insurance
##  [39] Officers' Life Insurance     Officers' Life Insurance
##  [41] Officers' Life Insurance     Officers' Life Insurance
##  [43] Office Supplies              Office Supplies
##  [45] Office Supplies              Office Supplies
##  [47] Office Supplies              Office Supplies
##  [49] Office Supplies              Wages Expense
##  [51] Wages Expense                Wages Expense
##  [53] Wages Expense                Wages Expense
##  [55] Wages Expense                Wages Expense
##  [57] Payroll Taxes                Payroll Taxes
##  [59] Payroll Taxes                Payroll Taxes
##  [61] Payroll Taxes                Payroll Taxes
##  [63] Payroll Taxes                Payroll Processing Fees
##  [65] Payroll Processing Fees      Payroll Processing Fees
##  [67] Payroll Processing Fees      Payroll Processing Fees
##  [69] Payroll Processing Fees      Payroll Processing Fees
##  [71] Accounting                   Accounting
##  [73] Accounting                   Accounting
##  [75] Accounting                   Accounting
##  [77] Accounting                   Legal Fees
##  [79] Legal Fees                   Legal Fees
##  [81] Legal Fees                   Legal Fees
##  [83] Legal Fees                   Legal Fees
##  [85] Licensing and Inspection     Licensing and Inspection
##  [87] Licensing and Inspection     Licensing and Inspection
##  [89] Licensing and Inspection     Licensing and Inspection
##  [91] Licensing and Inspection     Building Repairs
##  [93] Building Repairs             Building Repairs
##  [95] Building Repairs             Building Repairs
##  [97] Building Repairs             Building Repairs
##  [99] Well Repair and Maintenance  Well Repair and Maintenance
## [101] Well Repair and Maintenance  Well Repair and Maintenance
## [103] Well Repair and Maintenance  Well Repair and Maintenance
## [105] Well Repair and Maintenance  Vehicle Repairs and Service
## [107] Vehicle Repairs and Service  Vehicle Repairs and Service
## [109] Vehicle Repairs and Service  Vehicle Repairs and Service
## [111] Vehicle Repairs and Service  Vehicle Repairs and Service
## [113] Equipment Repair and Service Equipment Repair and Service
## [115] Equipment Repair and Service Equipment Repair and Service
## [117] Equipment Repair and Service Equipment Repair and Service
## [119] Equipment Repair and Service General Farm Supplies
## [121] General Farm Supplies        General Farm Supplies
## [123] General Farm Supplies        General Farm Supplies
## [125] General Farm Supplies        General Farm Supplies
## [127] Water Treatment Supplies     Water Treatment Supplies
## [129] Water Treatment Supplies     Water Treatment Supplies
## [131] Water Treatment Supplies     Water Treatment Supplies
## [133] Water Treatment Supplies     Small Equipment Expense
## [135] Small Equipment Expense      Small Equipment Expense
## [137] Small Equipment Expense      Small Equipment Expense
```

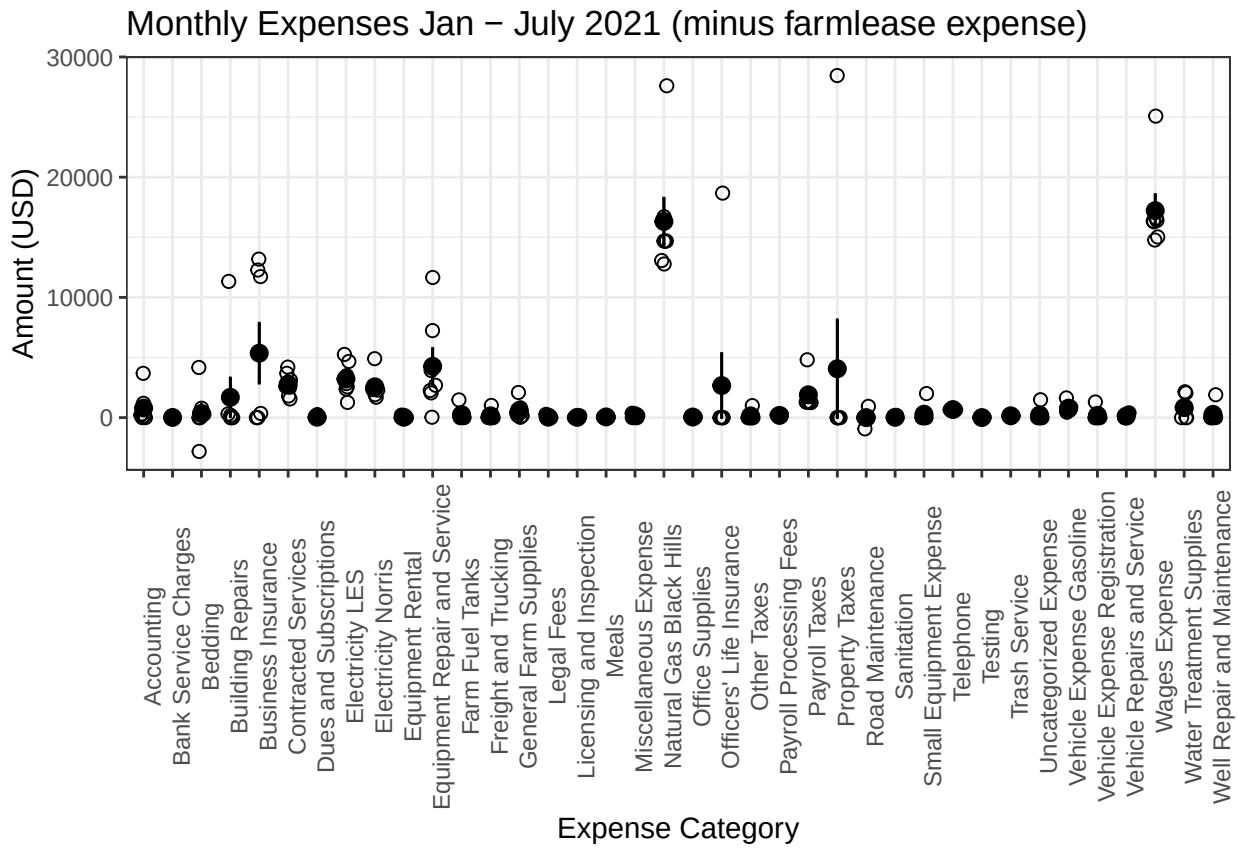
```
## [139] Small Equipment Expense      Small Equipment Expense
## [141] Testing                      Testing
## [143] Testing                      Testing
## [145] Testing                      Testing
## [147] Testing                      Property Taxes
## [149] Property Taxes               Property Taxes
## [151] Property Taxes               Property Taxes
## [153] Property Taxes               Property Taxes
## [155] Other Taxes                  Other Taxes
## [157] Other Taxes                  Other Taxes
## [159] Other Taxes                  Other Taxes
## [161] Other Taxes                  Telephone
## [163] Telephone                    Telephone
## [165] Telephone                    Telephone
## [167] Telephone                    Telephone
## [169] Natural Gas Black Hills      Natural Gas Black Hills
## [171] Natural Gas Black Hills      Natural Gas Black Hills
## [173] Natural Gas Black Hills      Natural Gas Black Hills
## [175] Natural Gas Black Hills      Electricity Norris
## [177] Electricity Norris           Electricity Norris
## [179] Electricity Norris           Electricity Norris
## [181] Electricity Norris           Electricity Norris
## [183] Electricity LES              Electricity LES
## [185] Electricity LES              Electricity LES
## [187] Electricity LES              Electricity LES
## [189] Electricity LES              Vehicle Expense Gasoline
## [191] Vehicle Expense Gasoline     Vehicle Expense Gasoline
## [193] Vehicle Expense Gasoline     Vehicle Expense Gasoline
## [195] Vehicle Expense Gasoline     Vehicle Expense Gasoline
## [197] Vehicle Expense Registration Vehicle Expense Registration
## [199] Vehicle Expense Registration Vehicle Expense Registration
## [201] Vehicle Expense Registration Vehicle Expense Registration
## [203] Vehicle Expense Registration Contracted Services
## [205] Contracted Services          Contracted Services
## [207] Contracted Services          Contracted Services
## [209] Contracted Services          Contracted Services
## [211] Meals                        Meals
## [213] Meals                        Meals
## [215] Meals                        Meals
## [217] Meals                        Farm Fuel Tanks
## [219] Farm Fuel Tanks              Farm Fuel Tanks
## [221] Farm Fuel Tanks              Farm Fuel Tanks
## [223] Farm Fuel Tanks              Farm Fuel Tanks
## [225] Farm Lease Expense           Farm Lease Expense
## [227] Farm Lease Expense           Farm Lease Expense
## [229] Farm Lease Expense           Farm Lease Expense
## [231] Farm Lease Expense           Bedding
## [233] Bedding                      Bedding
## [235] Bedding                      Bedding
## [237] Bedding                      Bedding
## [239] Trash Service                Trash Service
## [241] Trash Service                Trash Service
## [243] Trash Service                Trash Service
## [245] Trash Service                Sanitation
```

```
## [247] Sanitation                   Sanitation
## [249] Sanitation                   Sanitation
## [251] Sanitation                   Sanitation
## [253] Road Maintenance             Road Maintenance
## [255] Road Maintenance             Road Maintenance
## [257] Road Maintenance             Road Maintenance
## [259] Road Maintenance             Miscellaneous Expense
## [261] Miscellaneous Expense        Miscellaneous Expense
## [263] Miscellaneous Expense        Miscellaneous Expense
## [265] Miscellaneous Expense        Miscellaneous Expense
## [267] Uncategorized Expense        Uncategorized Expense
## [269] Uncategorized Expense        Uncategorized Expense
## [271] Uncategorized Expense        Uncategorized Expense
## [273] Uncategorized Expense
## 39 Levels: Accounting Bank Service Charges Bedding ... Well Repair and Maintenance
```

```
expenses_minus_farmlease <- expense[-c(225:231),]
average_minus_farmlease <- average_table[-(13),]

expense_plot_minus_farmlease <- ggplot(expenses_minus_farmlease, aes(x=Category_Name, y=Amount)) +
  geom_point(cex = 2, pch = 1.0,position = position_jitter(w = 0.1, h = 0)) +
  stat_summary(fun.data = 'mean_se', geom = 'errorbar', width = 0.1) +
  stat_summary(fun.data = 'mean_se', geom = 'pointrange') +
  geom_point(data = average_minus_farmlease, aes(x = Category_Name, y = average))

expense_plot_minus_farmlease
```



```
no_farmlease_expenses_plot <-
  expense_plot_minus_farmlease +
  theme_bw() +
  theme(axis.text.x = element_text(angle = 90)) +
  labs(title = "Monthly Expenses Jan - July 2021 (minus farmlease expense)",
       x = "Expense Category",
       y = "Amount (USD)")
no_farmlease_expenses_plot
```




```
ggsave(no_farmlease_expenses_plot, file = "no_farmlease_expenses.png")
```

```
## Saving 6.5 x 4.5 in image
```

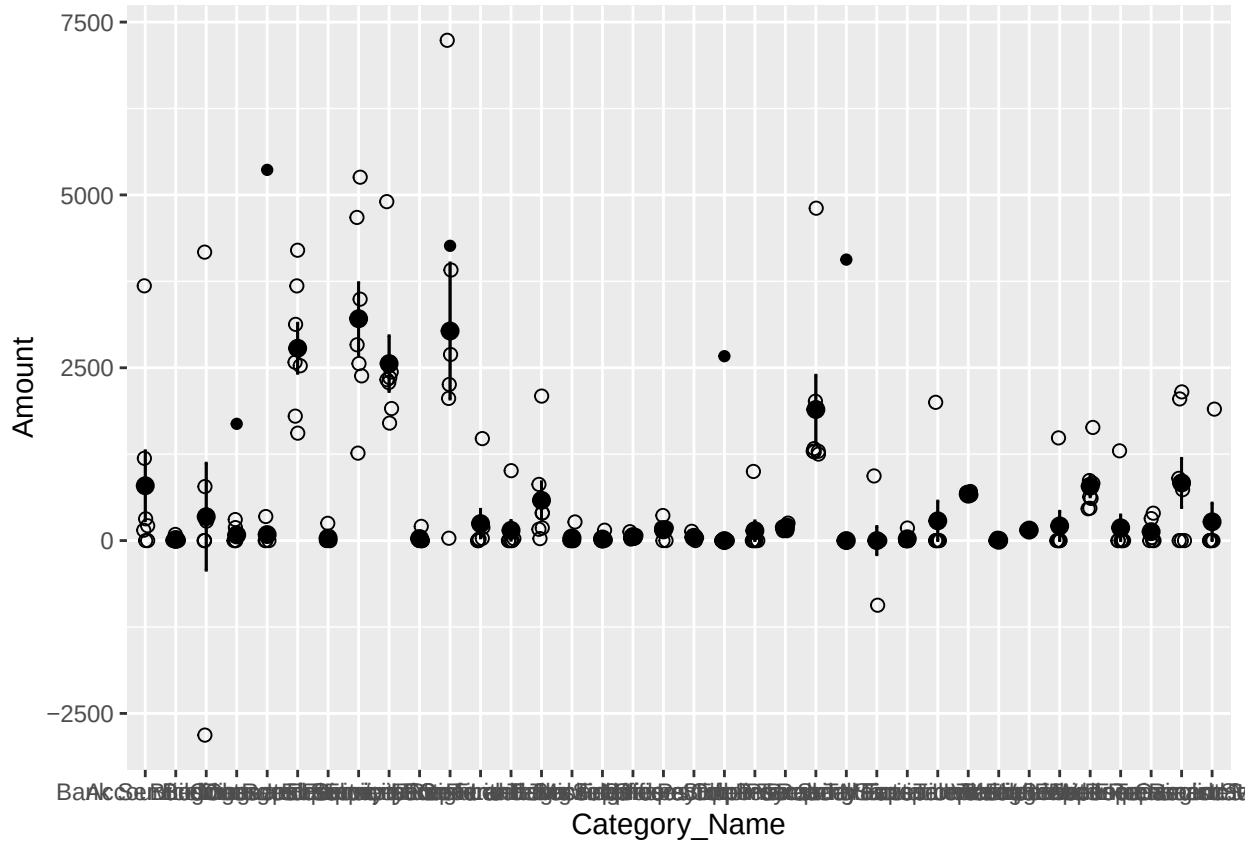
Make a chart of expensees below 10k

```
expenses_below_10k <- expense[expense$Amount<10000,]
summary(expenses_below_10k)
```

```
##  Meta_Category_Number            Meta_Category_Name Category_Number
##  67000  : 28          Supplies             : 28      60000  :  7
##  66000  : 26          Repairs              : 26      60600  :  7
##  65000  : 21          Professional Fees    : 21      61000  :  7
```

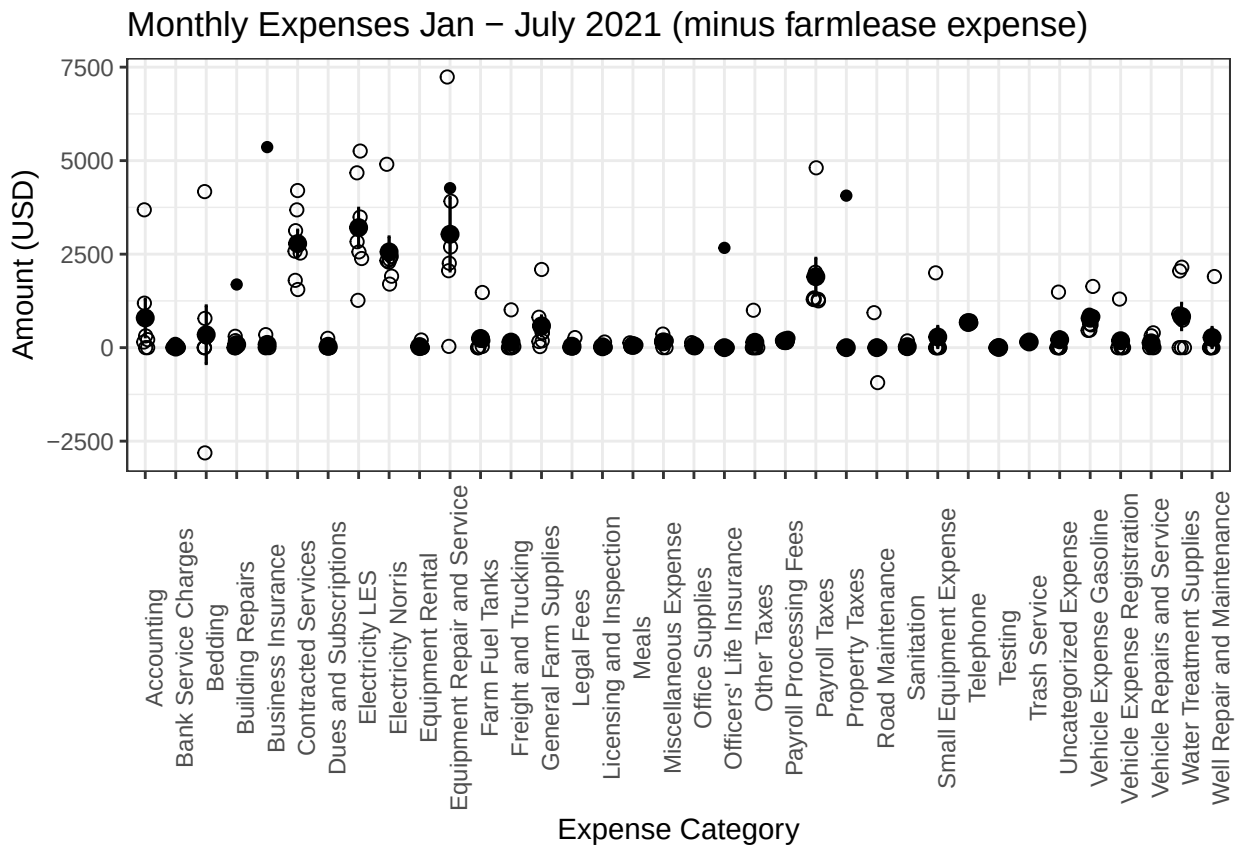
```
##  60001  : 14          Fees                : 14      61300  :  7
##  64001  : 14          Payroll             : 14      63000  :  7
##  69200  : 14          Trash and Sanitation: 14      64300  :  7
##  (Other):128          (Other)             :128      (Other):203
##                  Category_Name      Month        Amount
##  Accounting            :  7   April    :35   Min.   :-2813.75
##  Bank Service Charges  :  7   February:35   1st Qu.:    0.00
##  Bedding               :  7   January :35   Median :   28.32
##  Contracted Services   :  7   July    :35   Mean   :  559.23
##  Dues and Subscriptions:  7   June    :36   3rd Qu.:  632.65
##  Electricity LES       :  7   March   :34   Max.   : 7236.78
##  (Other)               :203   May     :35
```

```
average_below_10k <- average_table[average_table$average<10000,]

expense_plot_below_10k <- ggplot(expenses_below_10k, aes(x=Category_Name, y=Amount)) +
  geom_point(cex = 2, pch = 1.0,position = position_jitter(w = 0.1, h = 0)) +
  stat_summary(fun.data = 'mean_se', geom = 'errorbar', width = 0.1) +
  stat_summary(fun.data = 'mean_se', geom = 'pointrange') +
  geom_point(data = average_below_10k, aes(x = Category_Name, y = average))

expense_plot_below_10k
```




```
below_10k_expenses_plot <-
  expense_plot_below_10k +
```

```
  theme_bw() +
  theme(axis.text.x = element_text(angle = 90)) +
  labs(title = "Monthly Expenses Jan - July 2021 (minus farmlease expense)",
       x = "Expense Category",
       y = "Amount (USD)")
below_10k_expenses_plot
```




```
ggsave(below_10k_expenses_plot, file = "below_10k_expenses.png")
```

```
## Saving 6.5 x 4.5 in image
```

Average Expenses

```
names(average_table)
```

```
## [1] "Category_Name" "min"           "average"       "sd"
## [5] "se"            "med"           "max"
```

```
averages <- average_table[,c(1, 3, 5)]
view(averages)

averages_table <- datatable(averages, rownames = FALSE, class = 'cell-border stripe')
DT::saveWidget(averages_table, "month_expense_table.html")
```

Budget

```
projected <- lm(Amount ~ Category_Name, data = expense)
summary(projected)
```

```
##
## Call:
## lm(formula = Amount ~ Category_Name, data = expense)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -33205   -350    -42      0  71794
##
## Coefficients:
##                                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)                               793.514   2705.080   0.293    0.770
## Category_NameBank Service Charges        -777.817   3825.560  -0.203    0.839
## Category_NameBedding                     -447.621   3825.560  -0.117    0.907
## Category_NameBuilding Repairs             895.291   3825.560   0.234    0.815
## Category_NameBusiness Insurance          4568.864   3825.560   1.194    0.234
## Category_NameContracted Services         1988.641   3825.560   0.520    0.604
## Category_NameDues and Subscriptions      -756.887   3825.560  -0.198    0.843
## Category_NameElectricity LES             2415.570   3825.560   0.631    0.528
## Category_NameElectricity Norris          1766.603   3825.560   0.462    0.645
## Category_NameEquipment Rental            -764.167   3825.560  -0.200    0.842
## Category_NameEquipment Repair and Service 3470.631   3825.560   0.907    0.365
## Category_NameFarm Fuel Tanks             -547.786   3825.560  -0.143    0.886
## Category_NameFarm Lease Expense         89411.466   3825.560  23.372  < 2e-16
## Category_NameFreight and Trucking        -645.019   3825.560  -0.169    0.866
## Category_NameGeneral Farm Supplies       -211.151   3825.560  -0.055    0.956
## Category_NameLegal Fees                  -755.029   3825.560  -0.197    0.844
## Category_NameLicensing and Inspection    -770.617   3825.560  -0.201    0.841
## Category_NameMeals                       -735.689   3825.560  -0.192    0.848
## Category_NameMiscellaneous Expense       -637.977   3825.560  -0.167    0.868
## Category_NameNatural Gas Black Hills    15522.647   3825.560   4.058 6.76e-05
## Category_NameOffice Supplies             -745.763   3825.560  -0.195    0.846
## Category_NameOfficers' Life Insurance    1874.071   3825.560   0.490    0.625
## Category_NameOther Taxes                 -650.657   3825.560  -0.170    0.865
## Category_NamePayroll Processing Fees     -609.009   3825.560  -0.159    0.874
## Category_NamePayroll Taxes               1102.866   3825.560   0.288    0.773
## Category_NameProperty Taxes              3271.173   3825.560   0.855    0.393
## Category_NameRoad Maintenance            -793.514   3825.560  -0.207    0.836
## Category_NameSanitation                  -767.591   3825.560  -0.201    0.841
## Category_NameSmall Equipment Expense     -507.800   3825.560  -0.133    0.895
## Category_NameTelephone                   -121.514   3825.560  -0.032    0.975
## Category_NameTesting                     -788.800   3825.560  -0.206    0.837
## Category_NameTrash Service               -641.514   3825.560  -0.168    0.867
## Category_NameUncategorized Expense       -581.339   3825.560  -0.152    0.879
## Category_NameVehicle Expense Gasoline      -7.076   3825.560  -0.002    0.999
## Category_NameVehicle Expense Registration -608.013   3825.560  -0.159    0.874
## Category_NameVehicle Repairs and Service  -664.386   3825.560  -0.174    0.862
## Category_NameWages Expense              16423.753   3825.560   4.293 2.58e-05
## Category_NameWater Treatment Supplies      40.324   3825.560   0.011    0.992
```

```
## Category_NameWell Repair and Maintenance   -521.881   3825.560  -0.136    0.892
##
## (Intercept)
## Category_NameBank Service Charges
## Category_NameBedding
## Category_NameBuilding Repairs
## Category_NameBusiness Insurance
## Category_NameContracted Services
## Category_NameDues and Subscriptions
## Category_NameElectricity LES
## Category_NameElectricity Norris
## Category_NameEquipment Rental
## Category_NameEquipment Repair and Service
## Category_NameFarm Fuel Tanks
## Category_NameFarm Lease Expense           ***
## Category_NameFreight and Trucking
## Category_NameGeneral Farm Supplies
## Category_NameLegal Fees
## Category_NameLicensing and Inspection
## Category_NameMeals
## Category_NameMiscellaneous Expense
## Category_NameNatural Gas Black Hills      ***
## Category_NameOffice Supplies
## Category_NameOfficers' Life Insurance
## Category_NameOther Taxes
## Category_NamePayroll Processing Fees
## Category_NamePayroll Taxes
## Category_NameProperty Taxes
## Category_NameRoad Maintenance
## Category_NameSanitation
## Category_NameSmall Equipment Expense
## Category_NameTelephone
## Category_NameTesting
## Category_NameTrash Service
## Category_NameUncategorized Expense
## Category_NameVehicle Expense Gasoline
## Category_NameVehicle Expense Registration
## Category_NameVehicle Repairs and Service
## Category_NameWages Expense                ***
## Category_NameWater Treatment Supplies
## Category_NameWell Repair and Maintenance
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 7157 on 234 degrees of freedom
## Multiple R-squared:  0.8265, Adjusted R-squared:  0.7984
## F-statistic: 29.34 on 38 and 234 DF,  p-value: < 2.2e-16
```

```
##okay so this was pointless because it does the group intercept
```

Average monthly expense

```
average_monthly_expenses <- mean(month_expense_summary$Cost)
average_monthly_expenses
```

```
## [1] 158640.3
```

INCOME

Import and clean data

```
income <- read.csv("income_janjuly2021.csv", header = TRUE)
summary(income)
```

```
##  Category_Name      Category_Number    Month              Amount
##  Length:35          Min.   :  999   Length:35          Min.   :     0.00
##  Class :character   1st Qu.:40000   Class :character   1st Qu.:    38.76
##  Mode  :character   Median :41000   Mode  :character   Median :  7589.56
##                     Mean   :33400                      Mean   : 30074.62
##                     3rd Qu.:42000                      3rd Qu.: 19458.52
##                     Max.   :43000                      Max.   :114000.00
```

```
income$Category_Name = as.factor(income$Category_Name)
income$Category_Number = as.factor(income$Category_Number)
income$Month = as.factor(income$Month)
```

Make summary tables

Summarize by month

```
#summary by month
income_summary <- income %>% group_by(Category_Name, Category_Number, Month) %>%
                                  summarise(Cost = sum(Amount))
```

```
## `summarise()` regrouping output by 'Category_Name', 'Category_Number' (override with `.groups` argume
```

```
wide_income <- pivot_wider(income_summary,
                           names_from = Month,
                           values_from = Cost)

#View(wide_income)

wide_income <- wide_income[c("Category_Name", "January", "February", "March", "April", "May", "June", "
```

```
#summary by category
income_cat <- income %>% group_by(Category_Name) %>%
                             summarise(Total = sum(Amount))
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
View(income_cat)


#Join income_cat and wide_income
income_Summary_1 <- full_join(wide_income, income_cat)
```

```
## Joining, by = "Category_Name"
```

```
#make a datatable
month_income_table <- datatable(income_Summary_1, rownames = FALSE, class = 'cell-border stripe')

DT::saveWidget(month_income_table, "month_income_table.html")
```

Monthly income summary

```
#summary by month
month_income_summary <- income %>% group_by(Month) %>%
                                  summarise(Cost = sum(Amount))
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
wide_month_income <- pivot_wider(month_income_summary,
                            names_from = Month,
                            values_from = Cost)

#View(month_income_summary)

wide_month_income$Category_Name = "Month_total"
wide_month_income$Category_Number = "00000"
wide_month_income$Total = sum(month_income_summary$Cost)


wide_month_income <- wide_month_income[c("Category_Name", "Category_Number", "January", "February", "Ma

View(wide_month_income)

#summary by category
#income_cat <- income %>% group_by(Category_Name) %>%
#                               summarise(Total = sum(Amount))

#View(income_cat)


#Join income_cat and wide_income
Month_income_Summary_1 <- full_join(wide_month_income, income_Summary_1)
```

```
## Joining, by = c("Category_Name", "January", "February", "March", "April", "May", "June", "July", "To
```

```
#make a datatable
month_income_table <- datatable(Month_income_Summary_1, rownames = FALSE, class = 'cell-border stripe')

DT::saveWidget(month_income_table, "month_income_table.html")
```

Average Monthly Income

```
average_monthly_income <- mean(month_income_summary$Cost)
average_monthly_income
```

```
## [1] 150373.1
```

View the average, min, med, and max operating income by month

```
average_income_table <- income %>% group_by(Category_Name) %>%
                        summarise(min = min(Amount),
                                  average = round(mean(Amount), digits=2),
                                  sd = round(sd(Amount), digits=2),
                                  med = median(Amount),
                                  max = max(Amount))
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
average_income_table
```

```
## # A tibble: 5 x 6
##   Category_Name             min average     sd     med     max
##   <fct>                   <dbl>   <dbl>  <dbl>   <dbl>   <dbl>
## 1 Broiler Lease Income 111909.  112416.   223. 112500  112500
## 2 Incentive Payments     3161.    9461.  5707    7590.  17802.
## 3 Manure                    0     7090.  6688.  10716   13536
## 4 Miscellaneous            76.5   5121.  8567.    309.  21116.
## 5 Uncategorized             0    16286. 43088.      0  114000
```

```
# make a standard error column

average_income_table$se = round(average_income_table$sd/(sqrt(7)), digits=2)

average_income_table
```

```
## # A tibble: 5 x 7
##   Category_Name             min average     sd     med     max      se
##   <fct>                   <dbl>   <dbl>  <dbl>   <dbl>   <dbl>   <dbl>
## 1 Broiler Lease Income 111909.  112416.   223. 112500  112500     84.4
## 2 Incentive Payments     3161.    9461.  5707    7590.  17802.  2157.
## 3 Manure                    0     7090.  6688.  10716   13536   2528.
## 4 Miscellaneous            76.5   5121.  8567.    309.  21116.  3238.
## 5 Uncategorized             0    16286. 43088.      0  114000  16286.
```

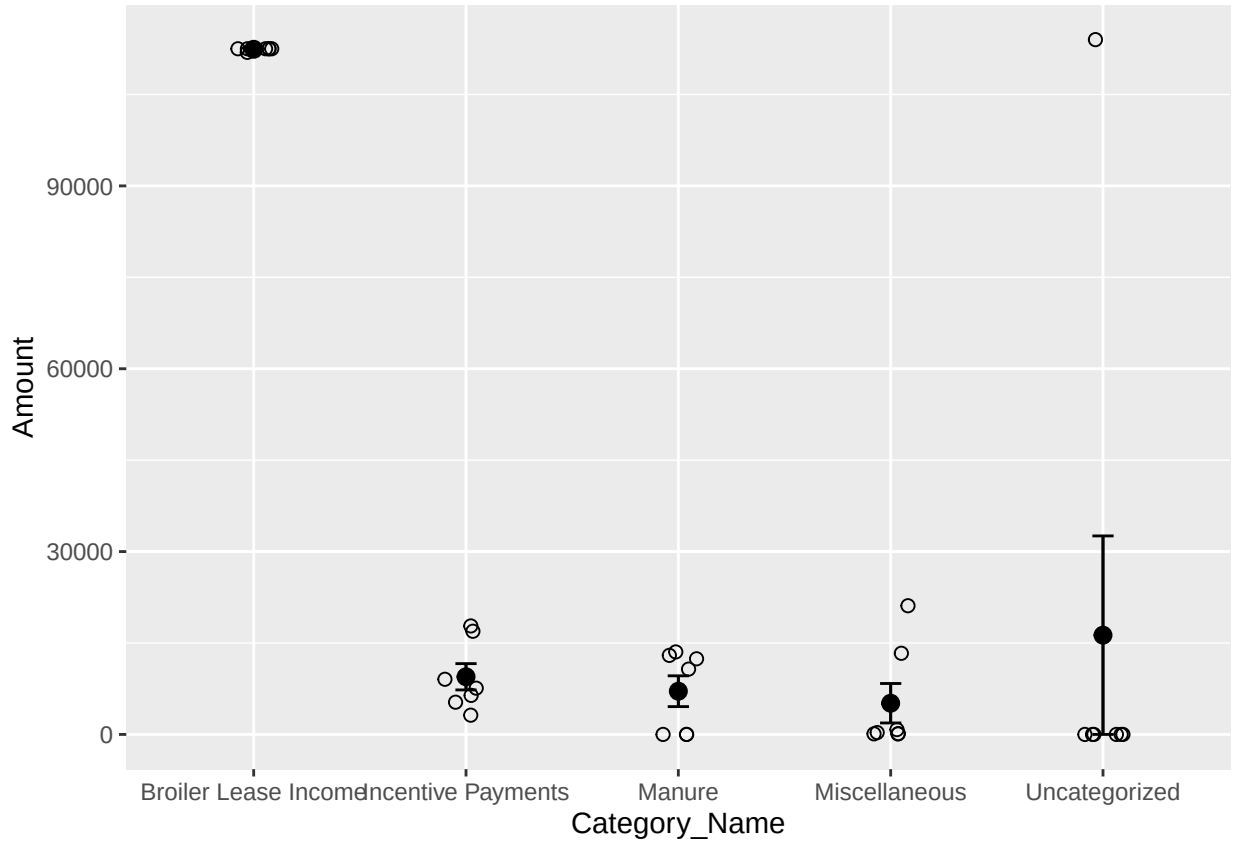
```
average_income_table <- average_income_table[c("Category_Name", "min", "average", "sd", "se", "med", "ma
```

Make a datatable

```
avg_income_dattable <- datatable(average_income_table, rownames = FALSE, class = 'cell-border stripe')

DT::saveWidget(avg_income_dattable, "avg_income_table.html")
```

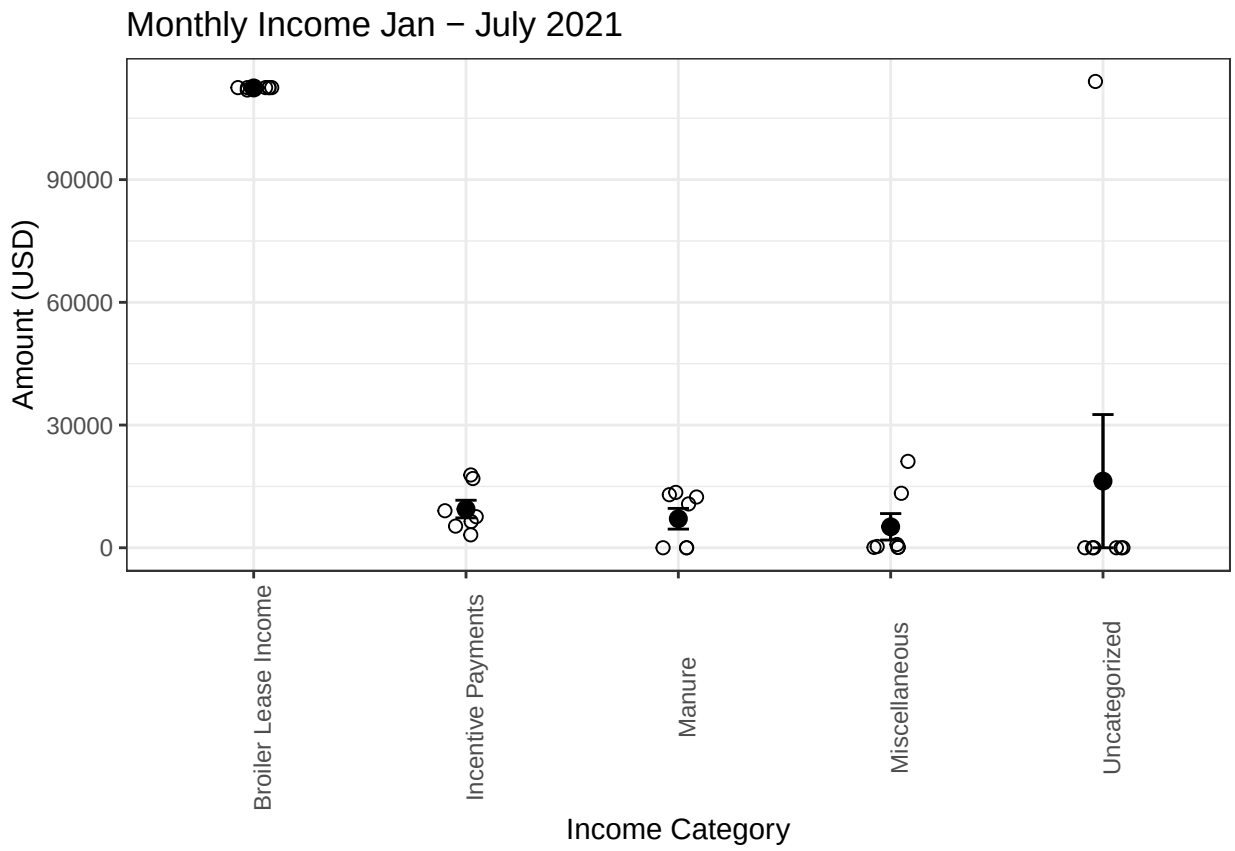
Make some graphs

```
income_plot <- ggplot(income, aes(x=Category_Name, y=Amount)) +
  geom_point(cex = 2, pch = 1.0,position = position_jitter(w = 0.1, h = 0)) +
  stat_summary(fun.data = 'mean_se', geom = 'errorbar', width = 0.1) +
  stat_summary(fun.data = 'mean_se', geom = 'pointrange') +
  geom_point(data = average_income_table, aes(x = Category_Name, y = average))

income_plot
```




```
all_income_plot <-
  income_plot +
  theme_bw() +
  theme(axis.text.x = element_text(angle = 90)) +
```

```
  labs(title = "Monthly Income Jan - July 2021",
       x = "Income Category",
       y = "Amount (USD)")
all_income_plot
```




```
ggsave(all_income_plot, file = "all_income.png")
```

```
## Saving 6.5 x 4.5 in image
```

Income less Expenses

```
average_monthly_income - average_monthly_expenses
```

```
## [1] -8267.261
```

The average monthly income less expenses is $-8267.261 **This does not include depreciation expenses, only operating expenses